

INFORMATION REPORT INFORMATION REPORT

CENTRAL INTELLIGENCE AGENCY

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G-O-N-F-I-D-E-N-T-I-A-L

50X1-HUM

COUNTRY Hungary

REPORT

SUBJECT Data on Hungarian "Ikarus" Buses

DATE DISTR. 16 January 1959

50X1-HUM

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DATE OF INFO.
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SOURCE EVALUATIONS ARE DEFINITIVE. APPRAISAL OF CONTENT IS TENTATIVE.

- a. Manual containing operating and maintenance instructions for the "Ikarus 306" bus. 50X1-HUM
 - b. Catalogue of spare parts for the "Ikarus 306" bus.
 - c. Service blanks for bus servicing - "Ikarus Type 31-32".
 - d. List of tools and accessories for "Ikarus Bus Type 30, 31, 31L, 32".
2. When detached from this cover, the attachment may be regarded as UNCLASSIFIED.

Distribution of Attachment:
ORR

50X1-HUM

G-O-N-F-I-D-E-N-T-I-A-L

STATE	ARMY	NAVY	AIR	FBI	AEC					
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(Note: Washington distribution indicated by "X"; Field distribution by "#".)

INFORMATION REPORT INFORMATION REPORT

Szorszám és tartozékjegyzék
Ikarus 30,31, 31 L, 32 typ.autóbuszokhoz.

Werkzeug - und Zubehörliste
für Ikarus Busse Type 30, 31, 31 L, 32.

Tools and accessories list
for Ikarus Bus type 30, 31, 31 L, 32.

1	db	kettős villáskulcs 8 x 9	
	St	Doppelgabelschlüssel "	
	p	fork wrench bilateral "	
1	"	"	10x11
1	"	"	12x13
1	"	"	14x15
1	"	"	17x19
1	"	"	22x24
1	"	"	27x30
1	"	"	32x36
1	"	korosztvágó Kreuzmeißel cross outter	
1	"	lyukasztó 5 mm Ø Durchschläger drift	
1	"	csőkulcs 14x17 Rohrschlüssel socket wrench	
1	"	" 19x22	
1	"	tűskkulcs Eckschlüssel angle wrench	
1	"	csavarhúzó nyéllel 0.6 mm. Schraubenzieher mit Griff screw driver with handle	
1	"	" " 0.8 mm.	
1	"	egycémes fogó Kombinationszange universal pliers	
1	"	kalapács nyéllel, 500 gr Hammer mit Stiel hammer with wood handle	
1	"	keréknyerő kulcs Kurbelschlüssel wheel nather wrench	
1	"	szorolóvas Montierreison bending iron	

- 2 -

- 1 db. állítható oszvar kulcs
verstellbarer Schraubenschlüssel /Engländer/
monkey-wrench
- 1 " Lubzsíró prés
Lub Fettpresso
Lub grease press
- 1 " szelophézagmérő
Ventiloinstellungsmesse
valve set measurer
- 1 " olajemelő szárral
Hydr. Wagonheber mit Hebel
hydr. car lifter with lever
- 1 " légtelenítő kulcs
Entlüftungsschlüssel
exhaust air wrench
- 1 " légtelenítő gumicső
Entlüftungsröhr
exhaust air tube
- 1 " előreszoló
Vorfeilo
bastard file
- 1 " 4 kg-os poroltó készülék
Pulverfeuerlöschapparat 4 kg.
powder fire drencher 4 kg
- 1 " III. számú mentőláda
Rettungskasten Nr. III.
first - aid kit No. III.
- 1 " légfeszítő mérő
Luftmesser
air gauge
- 1 " gyújtáskapcsoló kulcs
Anlasserschlüssel
ignition key
- 1 " kombinált ládaajtókulcs
Kombinationsschlüssel für Ladetür
combined wrench for load door
- 1 " 8 m gumitömlő kompresszorhoz /csak városközi autóbuszokhoz/
Schlauch für Reifenfüllflaschen 8 m. /nur für Überlandbusse/
hose to rubberfill, 8 m /only for motor-coachs/
- 1 " üzemanyagbeöntő töltőcső
Einfülltrichter
filling funnel
- 1 " szerzsántáska
Werkzeugtasche
tool-bag
- 1 " tetősomagtartó ponyva /csak városközi kivitelű
tetősomagtartós autóbuszokhoz/
Plache für Dachgepäcksträger /nur für Überlandbusse/
cover to hood luggage /only for motor-coachs/
- 1 " pótkerék
Reserverad
spare wheel

Issue A.



IKARUS Type 31—32.

service blank for bus servicing.

Ikarus, — Body and Vehicle Works, — Budapest, XVI., Margit Street 2.

Issue A.



IKARUS Type 31—32.

service blank for bus servicing.

Ikarus, — Body and Vehicle Works, — Budapest, XVI., Margit Street 2.

FOR UNTROUBLED AND SECURE PASSENGER TRANSPORT BY BUS
ALL SERVICING PRESCRIBED IN THIS SERVICE BLANK SHOULD
BE DONE EXACTLY AFTER THE SPECIFIED MILEAGE.



BY NEGLECT OF SERVICING PRESCRIBED IN THIS SERVICE BLANK
THE SELLER WILL BE EXEMPTED FROM GUARANTEE
OBLIGATIONS.

BUS TYPE:

Chassis No

Engine No

Police No

Delivered on

Put into operation on

Operator

Locality

Street

Chassis No Engine No

Servicing afterkilometres is completed.

On 195.....

..... Signature of servicing station.


Engine No..... Chassis No..... Repair job No.....

Service blank 1.
Type 31-32.

After the first 500 kilometres the bus has to be serviced, as follows:

1. Change oil in oil pan with hot engine.
2. Change oil in steering gear, fuel injection pump, gear box, compressor, axle housing (spur gear housing, too).
3. Clean air filter and refill with clean oil.
4. Grease all parts requiring greasing (door butts, too).
5. Check accumulator acid level, clean and grease pole pieces.
6. Tighten nuts for spring pressure plates.
7. Tighten wheel bolts.
8. Tighten cylinder head nuts, with hot engine.
9. Check and adjust brakes.
10. Check air lines.
11. Check joints for transmission, tighten screws.
12. Check fan belts and adjust.
13. Check all joint screws (seats, engine fastening, shock absorbers and so on).
14. Check electric equipments.
15. Check and adjust clutch.
16. Drain waste water from air reservoirs.
17. Adjust valve clearance with cold engine.
18. Clean fuel fine filter.
19. Clean water pocket.
20. Clean edge-type oil filter.
21. Check tyre pressure.
22. Wash body.

Chassis No Engine No
 Servicing after kilometres is completed.
 On 195.....

..... Signature of servicing station. 

Engine No..... Chassis No..... Repair Job No.....

Service blank 2.
Type 31-32.

After 2000 kilometres the bus has to be serviced, as follows:

1. Change oil in oil pan with hot engine.
2. Check oil level in steering gear, gear box, axle housing, fuel injection pump.
3. Clean oil filter.
4. Clean air filter and refill with fresh oil.
5. Clean air filter for compressor.
6. Grease all parts requiring greasing (door butts, too).
7. Clean gas oil fine filter.
8. Clean water pocket.
9. Check wheel camber and caster angle.
10. Adjust valve clearance with cold engine.
11. Tighten cylinder head nuts with hot engine.
12. Check steering ear, tighten and lock screws.
13. Check air lines.
14. Check and adjust brakes.
15. Check and tighten all joint screws.
16. Tighten wheel bolts.
17. Check bearings for front wheel body, if necessary, tighten.
18. Drain waste water from air reservoirs.
19. Check oil level in shock absorber.
20. Check and adjust fan belts.
21. Check and adjust fuel injection pump on test bench.
22. Check and adjust fuel injection pump on test bench.
23. Check tyre pressure.
24. Wash body.

Chassis No Engine No

Servicing after kilometres is completed.

On 195.....

..... Signature of servicing station.

Engine No. Chassis No..... Repair Job No.....

Service blank 3.
Type 31-32.

After 4000 kilometres the bus has to be serviced, as follows:

1. Change oil in oil pan - with hot engine.
2. Check oil level in gear box, axle housing, steering gear, fuel injection pump (in governor, too).
3. Grease all parts requiring greasing (door butts, too).
4. Dismount clean and grease charging dynamo.
5. Clean air filter and refill with fresh oil.
6. Clean gas oil filter element.
7. Clean oil filter.
8. Check accumulator acid level, refill liquid, clean and grease pole pieces.
9. Check and adjust valves with cold engine.
10. Tighten wheel bolts.
11. Drain waste water from air reservoirs.
12. Check all electric equipments.
13. Check and adjust all V-belts.
14. Check and adjust nozzles.
15. Check terminal pressure of cylinders.
16. Check and adjust clutch.
17. Check and adjust brakes.
18. Check air lines.
19. Clean water pocket.
20. Check tyre pressure.
21. Wash body.

Chassis No Engine No
Servicing after kilometres is completed.
On 195.....

.....
Signature of servicing station.
.....

Engine No..... Chassis No..... Repair job No.....

Service blank 4.
Type 31 - 32.

After 6000 kilometres the bus has to be serviced, as follows:

- | | |
|--|---|
| 1. Change oil in oil pan - with hot engine. | 10 Check electric equipments. |
| 2. Check oil level in fuel injection pump, gear box, axle housing, steering gear, compressor (in governor, too). | 11. Check and adjust V-belts. |
| 3. Grease all parts requiring greasing. | 12. Check and adjust nozzles. |
| 4. Vent air from servo-brake, (if any) refill brake oil. | 13. Check and adjust brakes. |
| 5. Clean fine filter element. | 14. Check brake lines. |
| 6. Clean oil filter. | 15. Drain waste water from air reservoirs. |
| 7. Check pressure - reducing valve. | 16. Check steering gear, tighten and lock bolts. (if necessary, adjust backlash clearance). |
| 8. Check feed pump. | 17. Check all instruments. |
| 9. Adjust valve clearance with cold engine. | 18. Clean air filter and change oil. |
| | 19. Clean water pocket. |
| | 20. Check tyre pressure. |
| | 21. Wash body. |

Chassis No Engine No

Servicing after kilometres is completed.

On 195.....

..... Signature of servicing station.

Engine No.....	Chassis No.....	Repair job No.....	Service blank 5.
			Type 31—32.

After 8000 kilometres the bus has to be serviced, as follows:

1. Change oil in oil pan - with hot engine.
2. Check oil level in fuel injection pump, gear box, axle housing, steering gear, compressor (in governor, too).
3. Grease all parts requiring greasing.
4. Clean air filter and change oil.
5. Clean fine filter.
6. Clean oil filter.
7. Adjust valve clearance with cold engine.
8. Check all electric equipments.
9. Check and adjust nozzles.
10. Clean water pocket.
11. Drain waste water from air reservoirs.
12. Check and adjust brakes.
13. Check and adjust clutch.
14. Check tyre pressure.
15. Wash body.

Chassis No Engine No

Servicing after kilometres is completed.

On 195

..... Signature of servicing station.

Engine No..... Chassis No..... Repair job No.....

Service blank 6.
Type 31-32.

After 10 000 kilometres the bus has to be serviced, as follows:

1. Change oil in oil pan, steering gear, fuel injection pump, gear box, axle housing, compressor (in governor, too).
2. Grease all parts requiring greasing, check water pump, clean dynamo, check and clean clutch.
3. Dismount, clean and grease starter.
4. Adjust valve clearance with cold engine.
5. Clean oil filter.
6. Clean fine filter.
7. Check fuel injection pump (on test bench).
8. Check and adjust nozzles.
9. Check valves for feed pump.
10. Check and adjust gear - change lever casing.
11. Check universal joint, tighten screws.
12. Check suspension bearings for transmission shaft.
13. Check differential, adjust bevel-gear clearance.
14. Check and adjust brakes.
15. Check air lines.
16. Check electric equipments.
17. Clean accumulator pole pieces, and refill liquid.

./

- | | |
|---|---|
| <ol style="list-style-type: none">18. Check door-hinges, locks, if necessary, repair.19. Check window-lift mechanisms, if necessary, repair.20. Check and tighten all joint screws (window, luggage locker, seats, hand straps, curtain clasps, chassis and so on).21. Clean fuel tank.22. Check and adjust wheel camber and caster angle.23. Drain waste water from air reservoirs.24. Check terminal pressure of cylinders. | <ol style="list-style-type: none">25. Check and adjust shock absorbers.26. Clean air filter and refill with clean oil.27. Clean water pocket.28. Check and tighten bolts of steering gear, adjust backlash clearance and check lockings.29. Check tighten and lock nuts, for spring shackles.30. Tighten wheel bolts.31. Check tyre pressure.32. Check and adjust fan belts.33. Wash engine and oil pan with engine-scavenging liquid.34. Wash body. |
|---|---|

Chassis No Engine No

Service after kilometres is completed

Chassis No Engine No
Servicing afterkilometres is completed.
On 195.....
.....
..... Signature of servicing station.

Engine No..... Chassis No..... Repair job No.....	Service blank 7. Type 31-32.
After 12 000 kilometres the bus has to be serviced, as follows:	
1. Change oil in oil pan, with hot engine.	5. Check all joint elements, check and adjust brakes.
2. Check oil level in gear box, axle housing, steering gear, compressor, fuel injection pump (in governor, too).	6. Check electric equipments.
3. Grease all parts requiring greasing.	7. Drain waste water from air reservoirs.
4. Adjust and check valves, with cold engine.	8. Clean air filter and refill with fresh oil.
	9. Check steering gear.
	10. Check tyre pressure.
	11. Wash body.

Chassis No Engine No

Servicing after kilometres is completed.

On 195.....

.....
Signature of servicing station.

Engine No.....	Chassis No.....	Repair job No.....	Service blank 8. Type 31-32.
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After 15 000 kilometres the bus has to be serviced, as follows:

1. Change oil in oil pan - with hot engine.	7. Change oil filter.
2. Check oil level in steering gear, gear box, axle housing, fuel injection pump, compressor (in governor, too).	8. Check and adjust nozzles.
3. Clean air filter, change oil.	9. Check and adjust V-belts.
4. Grease all parts requiring greasing.	10. Check and adjust clutch.
5. Check and adjust valves.	11. Check and adjust gear - change lever casing.
6. Clean fuel filter.	12. Drain waste water from air reservoirs.
	13. Check tyre pressure.
	14. Wash body.

FOLLOW STRICTLY THE SERVICE INSTRUCTIONS OF BUS
AND EXECUTE ALL TECHNICAL PRESCRIPTIONS.



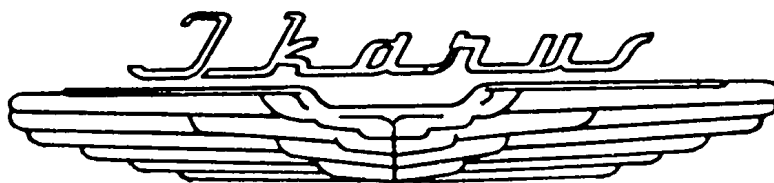
FILL QUANTITIES OF LUBRICANT

Quality appropriate to the season.

Engine:	oil pan:	14,— litres
	air filter:	0,2 litres
Gear box:		4,— litres
Axle housing:		8,— litres
Steering gear:		0,75 litres
Gear change lever casing: all:		1,— litre
Shock absorber:		0,2—0,4 litre
Lubricating plugs, as requested		
Front wheel hub:		0,5 gram

FOLLOW WITH ATTENTION THE MAINTENANCE AND SERVICE INSTRUCTIONS. THEY CONTAIN VERY IMPORTANT DIRECTIONS.

K-026



IKARUS 306

AUTOBUS

OPERATING AND MAINTENANCE
INSTRUCTIONS

BETRIEBS- UND WARTUNGSANLEITUNG
KEZELÉSI ÉS KARBANTARTÁSI UTASÍTÁS

1958



HUNGARIAN TRADING COMPANY FOR MOTOR VEHICLES
UNGARISCHES AUSSENHANDELSUNTERNEHMEN
FÜR KRAFTFAHRZEUGE
GÉPJÁRMŰ KÜLKERESKEDELMI VÁLLALAT

BUDAPEST, VI., BENCZUR UTCA 13. P. O. B. 62/249

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P R E F A C E

Year by year the IKARUS BODY and VEHICLE WORKS /Budapest, Mátyásföld/ presents more and more up-to-date bus models to the passenger public - it is true to say - almost all over the world.

With the IKARUS 30 Type construction, which is in every respect wellproved and everywhere appreciated model, the development of the Hungarian bus-manufacture has not ended at all. Now the IKARUS BODY and VEHICLE WORKS is manufacturing and presenting a new model; the IKARUS 306. This model contains not only the good features of the IKARUS 30 in very arduous service so often demonstrated such as; easy and safe operation, reliable steering characteristics, good acceleration, suitability for alpine routes and the low fuel consumption, but also by increasing this good properties as far as possible, eliminates some little defects of the operation, augments the passenger comfort and perfects the exterior appearance.

The favourable characteristics and economical operation, however, may only be fully realized, if the driver and the service staff will thoroughly study the constructional details of the vehicle, if timely and skilled servicing is ensured and in general; if the vehicle is driven and handled carefully, adhering to the rules of operation.

This Operating and Maintenance Instructions contain all the instructions and advices well-proved in the practice and corresponding to the experiences and the constructional peculiarities by use of which a number of operational troubles can be avoided. The careful observation of the routine maintenance and lubrication instructions ensures a long, economical and proper operation with relatively little job. When timely repairing the little troubles in accordance with the Trouble Trapping Chart, the greater time-consuming jobs and loss of the work-time can be saved.

The works described in the Operating and Maintenance Instructions can be in general performed by well-skilled bus driver by means of tools supplied with the vehicle. Works requiring large expert knowledge and special equipments are not detailed below, but it is pointed out to refer them to a specialized workshop properly equipped.

The numbers in text between brackets indicate the numbers of parts figuring of the corresponding plates. The locations "right-hand" and "left-hand" mean "right" and "left" directions looked from the driver's seat.

The observations, advices or possible corrections regarding the Operating and Maintenance Instructions write to the address below:-

IKARUS BODY and VEHICLES WORKS,
B u d a p e s t , XVI.,
Margit-u. 2.

The manufacturer works reserve the right to do construction, finish and dimension modifications.

TECHNICAL DATA

Main dimensions of the bus:

Wheel base	5000 mm
Front track	1740 mm
Rear track	1730 mm
Overall length	9135 mm
Overall width	2500 mm
Total height	2765 mm
Internal height of the passenger compartment	1500 mm
Internal width of the passenger-compartment	2353 mm
Turning circle diameter	21 m
Ground clearance under the front axle	370 mm
Ground clearance under the rear axle	240 mm
Empty weight	6000 kg
Maximum permissible weight	9200 kg
Maximum speed	76 km/h
Wheel rim measurement	5.00 S.20
Tyre measurement	850 -20 Extra HD

Engine

Type	Caspep D 414 four-stroke, water-cooled Diesel
Number of cylinders	4
Bore	112 mm
Stroke	140 mm
Stroke volume	5517 cm ³
Compression ratio	18 : 1
Maximum nominal output	95 HP
Maximum torque	34 mkg
Firing order	1-3-4-2
Number of compression rings	4
Number of oil control rings	2
Head diameter of inlet valve	52 mm
Head diameter of exhaust valve	48 mm
Valve clearance between valve stem and valve guide with cold engine	0.032...0.068 mm
Valve space between valve end and rocker with cold engine	0.2 mm
Valve lift	11.8 mm
Suction valve opens before top dead centre at	22° 30'
Suction valve closes before bottom dead centre at	71° 10'
Exhaust valve opens before bottom dead centre at	52° 30'
Exhaust valve closes after top dead centre at	41° 10'

Outer spring Inner spring

Free length of valve spring	54.5 mm	50.5 mm
Compression rate	1.63 kg	0.768 kg
Thickness of cylinder head gasket	0.8...1.2 mm	
Wrench torque of cylinder head stud nuts	900 cmkg	
Height of the compression chamber between pistons and cylinder head /measured with lead/	1.85 mm	
Oil pressure	3-5 kg/cm ²	
Oil capacity of the crankcase	14 litres	
Useful surface area of radiator	3400 cm ²	
Cooling system capacity	approx. 25 litres	
Water pump	vane-type impeller	
Position	on the left hand side of the engine	
Driving	by the dynamo through V-belt pulley by the intermediary of coupling disc	
<u>Fuel system</u>		
Capacity of fuel tank	about 160 litres	
Delivery pressure of feed pump	1.4...1.8 kg/cm ²	

Fuel fine filter	MON type with felt filter element
Make and type of fuel injection pump	BOSCH PE 4B 80E 410S 735
Sense of rotation seen from drive	right
Nozzle holder	Csepel
Nozzle	BOSCH DNOSD21v
Injection pressure	135 kg/cm ²
Injection advance set on BOSCH injection pump	before top dead centre 20 ^o ± 1 ^o
Di meter of injection pump plunger	8 mm
Injection pump plunger stroke . . .	10 mm
Leading edge lift	20 mm
Amount of the injected fuel on test bench;	
a. for full injection at 600 r.p.m. of pump	7.8...8.1 cm ³ for 100 turn around
b. For start injection at 200 r.p.m. of pump	10...11 cm ³ for 100 turn around

Clutch

Type	single-plate, dry pneumatic
Effective pressure of operating . .	3,8 kg/cm ²

Gear box and remote control

Type	hand-operated gear-change mechanism, with four forward speeds and one reverse
Gearing	Gears of the first speed and reverse straight-toothed, the other speeds helical gears
Gear shifting	First and reverse sliding gears, the other speeds constant mesh gears shifted by sliding dogs. Third and fourth speeds synchromesh.
Gear ratios in gear box	Corresponding max. travelling speeds at 2200 r.p.m.
1st speed 1:5,01.	14,9 km/h
2nd speed 1:2,95.	25.2 km/h
3rd speed 1:1,58.	47.2 km/h
4th speed 1:1	76 km/h
Reverse 1:6,5	11.5 km/h
Amount of the lubricant in gear box	8 litres

Rear axle and propeller shaft

Track of rear axle 1730 mm

Transmission ratio of final
drive 1:5,14
Drive spiral bevel pinion and
crown wheel

Bearings 2 tapered roller bear -
ings

Number of teeth on crown wheel 36
Number of teeth on pinion 7
Clearance between pinion and
crown wheel 0.20...0.30 mm
Bearings of the driving pinion 2 tapered roller bear -
ings 1 roller bearing

Universal joint

Type 6C and 5C needle roller
bearing

Propeller shaft

Tube diameter 70 and 60 mm /the propel-
ler shaft must be able
to rotate at 2400r.p.m.
without vibration./

Length between the centres of
joints Front /5C/ 1326 mm
Rear /6C/ 1951 mm

Rear wheel hub

Bearings 2 tapered roller bear-
ings

<u>Spring</u>	Front spring	Rear spring	Rear auxiliary
Number of spring leaves	9	12	6
Width of spring leaves	100 mm	100 mm	100 mm
Thickness of spring leaves	8-9	8-9	8
Unladen spring camber	136 mm	182 mm	70 mm
Number of spring clips	4	4	4
Clearance between pin and pin bush	0,062-0,020mm	0,062 mm	0,020 mm
Clearance between shackle pin and bush	0,075-0,025mm		

Shock absorbers

Check load with a weight of
 10 kg at the end of the lever . . . Duration of sinking
 Piston type shock absorbers 5 ± 1 mp

Front axle and steering gear

Track 1740 mm
 Toe-in /measured on the rims
 of the brake drums/ 2...4 mm
 Camber 2°
 Angle of lock measured on the
 inside wheel when the outside
 wheel is turned by 20° 23 ± 2°

King pin inclination 5°
 Castor angle 2° 30'

Steering gear

Type Globoid worm and double roller
 Transmission ratio 1 : 24
 Diameter of steering wheel 500 mm
 Diameter of turning circle 21 mm

ELECTRICAL EQUIPMENTSDynamo

Make BOSCH
 Type LJ/GK/300/24/1500 AR7
 Rated output 300 W

Voltage regulator

Make BOSCH
 Type RS/VE 300/24/1

Starter motor

Make BOSCH
 Type BNG 4/24/ CRS 163

Batteries

Make Battery Factory
 Type 6E 7G
 Capacity 105 A/h
 Charging current 10 A
 Density of electrolyte when
 fully charged 1.285/32 B6/
 Heater plug 1.7 V 34...40 A
 Type BOSCH GS2D30/KE/GA 2/1

Switches

Heater switch VILLIETZ
 Heater pilot light VILLIETZ
 Lighting switch VILLIETZ
 Direction indicator switch VILLIETZ swing switch

Bulbs

	Type	Mark
Headlamp bulb	Tungoram 24V 35/35 W	BA 20 d.1586
Town light bulb	" 24V 5 W	BA 15 s 2617
Instrument board bulb	" 24V 2 W	BA 7 s
Instrument lighting bulb	" 24V 2 W	BA 7 s
Rear registration number plate bulb	" 24V 5 W	S 8 7520
Stop-light bulb	" 24V 15 W	BA 15 s 1115
Fog lamp bulb	" 24V 35 W	BA 20 s 1130
Roof light bulb	" 24V 10 W	BA 15 s 6582
End-light and position light bulb	" 24V 35 W	BA 15 s 2617
Route and staircase light bulb	" 24V 10 W	S 8 7521
Direction indicator bulb front	" 24V 5 W	BA 15 s 2617
Direction indicator bulb side	" 24V 15 W	BA 15 s 1115
Control lamp bridge bulb	" 24V 2 W	BA 7 s
Position lights bulb	" 24V 5 W	BA 15 s 2617
Blinker bulb	" 24V 15 W	BA 15 s 1115

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GENERAL INFORMATION

1. On running-in a new or overhauled bus observe the instructions described in the chapter "Running-in the bus."
2. For the bus operation use fuel and lubricant stored in a closed container, which is free of dust and dirt, of specified quality and is sedimented.
3. Use for filling the radiator only clean, soft water. While filling up apply a filter with strainer to avoid the penetrating of dirt clogging the low-diameter tubes into the radiator.
4. In case of freeze - for off-duty period - drain off the coolant or apply anti-freeze liquid available in commerce adhering to the use instructions of it.
5. Do not run the engine at higher r.p.m. as necessary or in idling position for long time without use.
6. Travel only with bus without defect. Unusual noises

warn the driver to stop the vehicle immediately, to trace and eliminate the cause of the same, if necessary, call in an expert mechanic.

7. Begin the mounting only in case when one is well acquainted with the connection and fastening way from outside not perceptible of the single parts. This way serious damages may be avoided because the forcing in inadequate place will be eliminated.

8. Before disassembling the assembled units make sure carefully that all the fastenings of the single parts / nut, screw, wedge etc.,/ are slackened.

9. Already on beginning the mounting be near at hand all the aids, tools, as required, to avoid to interrupt the job for search anything. The tools should be always maintained in good condition. An inadequate tool requires in any case a surplus job, and might cause any serious damage. To use inadequate tool for the job /for instance a wrench not fitting the nut, a cutting instead of claw-type wrench/ is prohibited. This way damages the tools and the work-pieces equally.

10. On dismounting mark all corresponding parts. Place side by side the dismantled parts - as far as possible in due succession of mounting - on a work bench, board or rag. Replace the small parts such as nuts, screws, covers, if the work is not disturbed, even temporarily, to their places immediately. To wash new hearings when they come to mount packed in grease-

proof paper, in greasy condition, is prohibited, but they must be mounted in a condition lubricated in the factory.

12. Cleaning only of rough, not machined surfaces is permitted with wire brush, steel tool, do clean the fine parts, machined surfaces only with wood piece or brass tool.

13. Renew in any case the fastening parts /split pin, fastening ring, lock washer/ and the sealings /except the brass rings/ as their use saves unconsidered sum of money in comparison with the damage possibly caused by slackening of screw fastening or by leakage, if only the costs of the new mounting job to be performed considered.

14. Always lubricate before assembling the parts running in each other and fitting exactly into each other with the lubricant as specified. Always oil the nuts, screws before mounting. Before screwing in plunges the threaded part of stud being in the body into hermetic or tallow. Check carefully all fastenings /split pin, lock washer, lock plate etc./

15. When tightening the castellated nut /cylindrical, perforated nut/ the split pin borings do not coincide, place under a thick shim or diminish the lower part of the nut by means of abrasive paper placed on smoothing plate so that it coincides with the boring. Do not slacken nut.

16. Tighten the screws of renewed sealings and newly mounted parts only after having warmed up.

GENERAL MAINTENANCE INSTRUCTIONS.

A perfect bus driver must devote special care to be acquainted with his vehicle and has to perform maintenance work properly. Skilled preparing, running-in and proper driving are of equally great importance, as the proper maintenance work begins substantially when the bus is taken over.

Acceptance of the bus and its first putting into service.

The bus, newly delivered or overhauled, must be carefully inspected before being put into service. Inspect it all round and make sure that no accessories, tool-kits, spare tyre, as detailed in the inventory supplied with the vehicle, are missing.

The road test of the bus is a constituent part of the acceptance; put the bus into service, therefore in the following way:-

1. Measure and adjust air-pressure in all rubber tyres / 5.75 kg/cm² /
2. Check lubricant level in:
 - a. engine

- b. injection pump
- c. gear box
- d. rear axle housing

3. Fill up fuel tank with fuel as prescribed. If the bus was delivered with the fuel tank empty, fill up and bleed the whole fuel system as described later in the MAINTENANCE INSTRUCTIONS.

4. Lubricate all lubrication points in accordance with the lubrication instructions.

5. Check the accumulators; acid level must cover the plates by 10 ... 15 mm in each cell / filling up with distilled water / smear the cleaned poles with anti-corrosion grease. Tighten fastening screws of bearings.

6. Make sure of fastening of the registration plates.

7. Fill up the cooling system with soft water from the water-main, with clean rain water or boiled water /with anti freeze liquid in the winter./ When using anti-freeze coolant, do not fill up the radiator up to the aperture of the overflow pipe, but leave the level 30-50 mm lower.

8. Adjust the driver's seat to the most comfortable position required by the driver's stature.

9. Try electrical lighting and signal system for proper functioning /headlamps, brake and registration lights, position lamps, course table lighting, all three internal lighting circuits, get off alighting signal system, signal bells, direction indicator, horn./

10. Try steering gear for proper and easy functioning ; check, if it has not to great free running.

11. Start the engine as follows; set gear change lever into neutral position, switch on battery main switch, insert key into switch box and turn key, set hand feed lever for full

charging, turn the heater plug switch, /switch on/ and if the engine is cold, preheat for about 1 minute /till the heater pilot filament glows bright red,/ depress clutch pedal, switch on starter motor and let it run for maximum 8-10 seconds; after the engine has started, set hand feed lever back to free running and release clutch pedal. If during this the engine still has not started, preheat again. /The arrangement of the switches and the instruments is shown in Fig.1./

Warm engine will start without preheating, too.

When after repeated preheating the engine still refuse to start, do not continue experimenting, but trace and eliminate the cause of trouble with the aid of the Trouble Tracing Chart.

12. Observe the oil pressure gauge. Correct oil pressure is 3...5 kg/cm².

13. Heat up coolant to 60-70°C with the engine idling and the radiator screen drawn down. In the meantime observe the air pressure gauge and do not start, till the air pressure has reached 4.5 kg/cm², as this is the minimum pressure required for braking.

14. Check proper functioning of the brake system.

15. Lower radiator screen partly or entirely before starting in accordance with external temperature.

16. Release hand brake lever, depress clutch pedal and switch gear change lever into first speed. Meanwhile slowly release clutch pedal, depress accelerator pedal. In this way the bus will start slowly and smoothly.

17. For each subsequent speed change apply double de-clutching; at the first de-clutching set gear change lever

into neutral position, release clutch pedal and after the second de-clutching engage the next speed. In this way an easier and noiseless gear change may be attained.

For shifting from a higher to a lower speed, also depress the clutch pedal twice, but before the second de-clutching rev up engine by depressing the accelerator pedal, and so the speed change will require less effort and will be less noisy.

Engage reverse solely when the bus is not moving.

Running-in the bus.

The careful observation of the running-in instructions for the first 3000 km route of the new or overhauled bus is very important with a view to its subsequent performance and duration of service-life.

A motor vehicle, which has been properly run in, will give a better performance with lower fuel consumption, and in spite of lower lubricant consumption figures, the moving-rotating parts will wear out to a much less extent and operational safety will reach a much higher value.

Drive with decreased load and mean r.p.m. during first 3000 km of route, change back to lower speed in time so that the engine should not work under excessive strain.

Strictly adhere to the running-in instructions!

Running-in rules.

Travel for the first 500 km without load.

Do not exceed specified load between the first 500 - 3000 km and travel only on level roads.

Do not exceed following speeds for the first 3000 km:

1st speed 11 km/hour
2nd speed 19 km/hour
3rd speed 35 km/hour
4th speed 57 km/hour

First oil change at 500 km
Second oil change at 1500 km
Third oil change at 3000 km

After the first 3000 km the oil change is to be executed in accordance with the Lubrication Instructions.

Change oil in the gear box and rear axle at the first 1500 and 3000 km, after that at every 12,000 km according to the Lubrication Instructions.

Oil change is always to be performed while the engine is still warm; after the first 3000 km and then at each 12000 km remove sump, strainer of the oil pump, the lamellary filter element and rinse them in petrol thoroughly, dry and refit them.

Driving and using of the bus.

The instructions and recommendations about the proper driving and handling of the bus summarised here in short paragraphs are to be found in detail in the chapters describing the various corresponding constructional parts of the bus. The aim of this summary is to remind the driver of the rules to be observed while driving and handling the bus;

1. Before starting check daily level of the coolant, air pressure in the tyres, fuel level, lubricant level in the engine sump, the tightness of the fan belt, the wheelscrews, the signal system, lighting, brake air pressure. Always run with the engine cleaned of dust and dirt, but also keep clean the driver's seat, the controls and the mirrors. Remove stones lodged between the twin rear tyres several times a day if necessary.

2. When starting with a cold engine preheat for a sufficiently long time /the pilot filament should glow bright red/, do not operate the starter motor unnecessarily. In cold weather fill warm water into the radiator, in winter use an anti-freeze mixture. Before starting the vehicle, with the bus stationary, heat the cooling water to 60-70°C by letting the engine run in idling revolutions. When starting, do not forget to disengage the hand brake.

3. Always make a short check on the brake before getting under way, being responsible for life and fortune security.

4. While on the road avoid sudden braking except, if necessary, as the sudden braking not only incommodes the passengers, but also damages the mechanism of the bus. Use foot brake solely with the bus in motion. Take care that the brakes do not block the wheels and thus avoid skidding and the extension of the braking distance. Depress the clutch pedal only when stopping or changing speed. For temporary deceleration do not release the clutch; make use of the retarding power of the engine.

5. Speed change should be made noiseless by double declutching to save the gear box from undue stress.

While on the road do not use the clutch pedal for a foot-rest.

6. For uphill drives change to lower speed before reaching the ascent.

Beware of running down a slope with clutch or gear box disengaged; before striking into the down grade change to the speed eligible for travel up the same stretch.

7. Be sure to put a safety distance between your

vehicle and the next ahead. This distance must be as many metres as the number of km/h covered by the bus.

8. Do not overtake at road bends or along gradients, where the road is not in view over a safe distance ahead. Before overtaking glance at the retrovisor to see that no other vehicle is about to overtake. Bear in mind the width and length of the bus being greater than of other vehicles generally, therefore, when overtaking, it is blocking the stretch of road used by oncoming traffic for a longer while.

9. Keep constant watch over coolant temperature, maintaining it at 70-80°C by suitable adjustment of the radiator screen. If for any reason, the cooling water come to boil, stop the bus while leaving the engine idling a few minutes. To avoid scalding, do not remove the radiator cap until the coolant has stopped boiling. Do not supply cold water to the engine, while running, unless imperatively called for by an excessive depletion of coolant. For this case, have the engine run at r.p.m. hardly over the idling position and refill water slowly. When the system has run short of completely out of water, let the engine cool off to save the cylinder heads from cracking.

10. Do not overload the bus, as its route characteristics, stopping distance, etc., are adversely affected by undue loads.

11. Do not let the fuel tank run out, because the feed pump will suck air into the system. There is no means of eliminating trouble so arising, except by a time-consuming job of airing the entire system.

12. When stopping, depress the clutch, then shift the gear change lever into neutral and bring the hand feed lever

into bottom position. Now apply the hand brake and turn off the main switch of the electric system.

13. When stopping down a slope, set a wedge or a stone against each tyre after application of the hand brake. Before starting take care to clear them out of the way.

How to store the bus

The bus for a longer or even a shorter off-duty period can be maintained only by proper storing for safe operational condition.

In case of a shorter spell out of service, check air pressure in the tyres every week. If necessary, inflate tyres to the pressure as recommended. If possible, for laying up the vehicle, the best course is to jack up the bus, like in case of a longer spell out of service it should be done.

For a longer off-duty period, or when mounting the bus in any case the vehicle should be jacked up.

When laying up the bus by jacking, reduce air pressure to about 2 kg/cm² in tyres, drain off the cooling water. When the radiator was filled with anti-freeze liquid, store it in a clean container for the next use. Remove the batteries and store them in a shed together with the tool-kit and spare tyres. For handling of the battery besides functioning see the chapter of "Electrical Equipments".

Storing fuel.

Special attention is to be devoted to the clean storage of fuel. The plungers of the injection pump make an exact fit with the bores; their untimely wear by the erosive action of

impurities contained in the fuel tend to impair pump efficiency. The use of dirty fuel comes to cause untimely wear of nozzles, too. Obviously, the use of absolutely clean fuel is an imperative requisite of safe Diesel-engine service.

With unclean fuel in use the main fuel filter will foul up in no time, while minute particles of dirt will pass the filter. The best tried method of purifying such fuel is by sedimentation.

To this end, the newly delivered fuel is left to rest over a minimum period of 36-48 hours for the impurities to settle at the bottom of the container.

The fuel containers should be placed askew in order to collect the sediment in a corner of the container and to drain off it. As far as possible, it is advisable to make two small dimension containers and while one of them will be consumed, the other fuel will be sedimented.

Where no possibility is given to build a large dimension container, but one must consume fuel from barrel, proceed in the following way:-

Jack the delivered barrels at one side so as it is shown in the figure and leave the fuel to sediment over a period of 36-48 hours. When the barrel comes in turn to be consumed, do not move it, Carefully, in such a way as it is shown in the figure, introduce the pump and pump fuel without having agitated the container.

Do not use for fuel the sedimentary material left at

the corner of the barrel, it is however, suitable for cleaning.

Handling the rubber tyres /Fig.3./

One of the important factors of safe driving and trouble-free, economical service is the proper handling of rubber tyres, which is the driver's duty.

It is of vital importance to keep the 8.50 x 20 extra dimension tyres always to the correct air-pressure; 5.75kg/cm² prescribed.

Inadequate tyre pressure tends to impair the driver's safety and lead to premature breakdown of the expensive rubber tyres. Both higher and lower air-pressure values greatly affect suspension, direction stability, steering gear and brake system, and prejudice the safety of driving.

Before making up for the loss of air in the tyres, check each tyre for air-pressure, because in case of pressure losses widely discrepant in the several tyres, or in excess of normal, the cause is to be traced for early detection of tyre defect or injuries. This is the safest method of preventing more serious damage or accidents involving heavy casualties.

Another very important rule of proper rubber-tyre handling is to mount on the same axle tyres of about the same diameter. When changing tyres, therefore, always check the diameter and do not fit on a new tyre unless its difference in diameter, if any, from the old is a maximum of 6-8 mm. As far as possible use tyres of the same make, dimensions and tread.

The life of rubber tyres may be extended by making them wear evenly. The simplest plan to ensure this is to change tyres every 6,000 km in a manner shown in Fig.4.

Always change the two members of the twin tyres simultaneously, maintaining their relative positions, outer member kept outside, inner inside. This is to ensure that, while the direction of running is changed, the tyre members worn into conformity under different loads continue together on the same type of duty.

Latest research findings, confirmed by a number of tests have shown the common performance and life of twin tyres to be at an optimum with the members invariably maintaining their relative positions, each being kept respectively outside or inside throughout their time of service. Replace a damaged rear tyre, for the duration of repair, by a front one, and the latter by the spare tyre. With the damaged tyre repaired, refit it as well as the front and spare tyres to their respective original places.

The widely held view that the inner members of twin tyres are better run at lower air-pressure is utterly wrong, as reduced pressure in the inner tyre, which invariably bears the heaviest load, necessarily ends by destroying that tyre.

When changing tyres do not fail to inspect the wheel-rims thoroughly and to clean them with paraffin and a wire brush of all traces of corrosion. After drying coat the rims with an anti-corrosive varnish. Rims damaged or bent out of shape should be committed to the care of a specialised repair shop.

The functioning of the rubber tyre valve caps is not to be underrated as is commonly done by the motorists who think

that it is the best to carry about in the driver's pocket, as merely a handy aid to dismantling the valve. As a matter of fact, infiltrations of dust, mud or water into the valve will prevent it closing properly and ultimately lead to air leaks. The only way to obviate loss of air pressure through leakage is to keep the valve cap always tightly screwed on.

Particular care should, therefore, be taken to refit the valve cap tightly every time the valve is handled.

Periodically check all the wheels for alignment and the rear twin members for concentric running. As lack of wheel alignment tends to inflict heavy wear on the tyres, the wheels affected should be attended to at a specialised repair workshop.

Mounting rubber tyres

Mount 8.50 - 20 extra tyres, tubes and protecting strips on all wheel-rims of the bus. Before fitting the tube /2/ in the tyre, spray the inside of the tyre /1/ with talcum powder to lessen friction between the tyre and the tube. Take care during assembly to fit the valves well into their proper place.

Introduce the tube to the tyre and inflate it slightly, till it just fills out the tyre. Put the protecting strip /3/ into position on the wheel-rim. Push the tyre so prepared into the straight-side wheel-rim /4/ and pass the valve of the tube, to face upward, through the corresponding hole on the wheel-rim.

Next fit the side ring /5/ into the wheel-rim. Snap the retaining ring /6/ into position in the circular groove of the

wheel-rim to prevent the side ring from slipping off.

Now inflate the tyres to the prescribed pressure of 5.75 kg/cm² giving the tyre - while doing so - a few light taps with the flat side of a hammer in order to bring in and the side ring into correct position.

The same rules apply to the assembly of the twin tyres. The inner wheels are to be mounted with their convex side out, the outer ones with their side in. The wheel discs, pushed on the studs are secured with the wheel nuts, which should be tightened in turn proceeding in diagonal order.

Take special attention that the nuts are not overtightened /for instance by applying a long tube on the wrench/, as the splined end of the wheel hub screws stamped into the wheel hub may be turned or broken off. The wheel nut spanner in the tool-kit is dimensioned for proper tightening of the wheel nuts. After mounting, while on the road, retighten wheel nuts several times.

In the latest IKARUS 906 series, the front and rear wheel studs and nuts on the left side feature left-hand threads and accordingly, are unscrewed in clockwise and screwed on in anti-clockwise direction - a feature making for increased safety. These studs and nuts are provided with the identification mark "B".

On the first ride after tyre change, retighten the nuts repeatedly for the wheel discs to sit tight.

Dismounting and disassembly of tyres follow, as described above, in reverse order.

BUS ACCESSORIES.

The manufacturers works supply each bus with hand tools and accessories according to the list below:-

- | | | |
|---------------------------------------|-----------------------------|------|
| 1. Double fork wrench | 8 x 9 mm | 1 pc |
| 2. Double fork wrench | 10 x 11 " | 1 pc |
| 3. Double fork wrench | 12 x 13 " | 1 pc |
| 4. Double fork wrench | 14 x 15 " | 1 pc |
| 5. Double fork wrench | 17 x 19 " | 1 pc |
| 6. Double fork wrench | 22 x 24 " | 1 pc |
| 7. Double fork wrench | 27 x 30 " | 1 pc |
| 8. Double fork wrench | 32 x 36 " | 1 pc |
| 9. Tubular box-spanner | 14 x 17 " | 1 pc |
| 10. Tubular box-spanner | 19 x 22 " | 1 pc |
| 11. Screwdriver with handle | 0.6 " | 1 pc |
| 12. Screwdriver with handle | 0.8 " | 1 pc |
| 13. Bull nose pliers | | 1 pc |
| 14. Hammer with wood handle | | 1 pc |
| 15. Adjustable spanner | | 1 pc |
| 16. Greas gun | | 1 pc |
| 17. Tappet gauge | 0.2 x 8' x 100 | 1 pc |
| 18. Angle wrench | | 1 pc |
| 19. Bastard file | 250 mm half-round | 1 pc |
| 20. Punch | 5 mm # | 1 pc |
| 21. Cross cutter | | 1 pc |

- 22. Hydraulic jack with lever 1 pc
- 23. Hardwood block under jack 300 x 300 x 80 mm 1 pc
- 24. Wheel nut spanner 1 pc
- 25. Driving iron for wheel nut spanner 1 pc
- 26. Tube for compressor 8 m 8 m
- 27. Water filling filter 1 pc
- 28. Medicine chest No. III. 1 pc
- 29. Fire drencher 1 pc
- 30. Starter key 1 pc
- 31. Combined wrench for kist door 1 pc
- 32. Gallery tarpaulin-/only for vehicles provided with
roof gallery/ 1 pc
- 33. Tool-kit with key 1 pc
- 34. Maintenance Instructions 1 pc
- 35. Components part list 1 pc
- 36. Air pressure gauge 1 pc

DESCRIPTION AND MAINTENANCE OF THE BUS

In the following we give the description of the constructional details of the IKARUS 306 as well as the instructions for their proper maintenance.

The engine

The bus IKARUS 306 is powered by a four-cylinder, four stroke water-cooled CSEPEL D414 type Diesel engine with pre-combustion chamber and overhead valves.

The unit including the engine and the clutch together with the radiator is mounted on the bearer frame, and if necessary, this unit may be in a simple way withdrawn from the bus. The engine and clutch assembly is fastened on the bearing frame by the so called front and rear "GETEFO" type engine brackets. This way of fastening ensures the soft, elastic suspension of the engine, thus preventing that vibration of the engine can be taken up by the frame and as a consequence is the noiseless running of the engine.

Description of the engine

The block with cranscase is all-in-one piece cylinder, made of cast silumin /12/ provided with direct water-cooled, removable "wet" cylinder liners /10/. The cylinder liners fit into the cylinder block by precision-machined flange at their upper end, the lower end being sealed with two rubber gaskets.

Each cylinder has a separate cylinder head /1/ carrying the valve rockers /6/ and the valves /8 and 9/. In order to design more practically the combustion-space, it is required that the valve stems be slightly inclined. Each cylinder head made of special cast-iron comprises besides the valves inlet and exhaust ducts, water jacket and its apertures. The nozzle holder /53/ and the heater plug /51/ are also screwed into the cylinder head. The cylinder head gaskets sink in the groove formed by the cylinder block and the upper flange of the cylinder liner, being well protected from the high pressures and the excessive heat prevailing inside the cylinders.

The crankshaft /47/ is made of forged, refined steel. The journal surfaces are after flame-hardened; mirrorpolished. The five journals /22/ and the four crank-pins of the crankshaft run in lead-bronze-lined steel ball-bearing cups. Counter-weights /23/ fixed by screws ensure the balancing of the crankshaft. The cast-iron flywheel with the starter gearing /17/ on it, is secured by eight screws /15/ on the rear end of the crankshaft.

Each of the die cast light metal pistons /11/ are provided with 4 compression rings and 2 oil scraper rings. The gudgeon pin /39/ is fitted tightly into the piston and secured at each ends against slipping by safety circlips.

The "I" section wrought iron connecting rods /21/ are made likewise of refined steel, with thin big end divided under 45° , so that after dismantling the connecting rod cover, /20/ the connecting rod and the piston can be withdrawn upward together from the cylinder.

The camshaft /48/ is driven off the crankshaft by gear-couple /32 and 33/ /ratio: 1.2/. The cams are also hardened and mirror-polished.

The camshaft is not running in separate bearing cups but direct in the bores of the crank-case. The tappets /49/ lies with their hardened lower plate against the cams and open the valves /8 and 9/ by means of the pushrods, made of steel pipes and rockers. Each valve is closed by two valve springs /4/ fitted into one another.

The Diesel-engine of the bus requires four strokes to complete a cycle of operation, each of strokes being completed during a half rotation of the crankshaft. The inlet valve opens before the top dead centre at $22^{\circ} 30'$ and closes after the bottom dead centre at $71^{\circ} 10'$. The exhaust valve opens before the bottom dead centre at $52^{\circ} 30'$ and closes after the top dead centre at $41^{\circ} 10'$.

When a cold engine is started, the cold cylinder

walls will absorb the heat generated by the compression of air so suddenly that the temperature thus produced will be insufficient to ignite the injected fuel. In this case the injected fuel has to be ignited by cutting-in the heater plugs, arranged in the precombustion chamber /52./

Engine lubrication

The oil for the engine lubrication gathers in the sump. It is sucked from there by two mesh gear-type oil pump /8/, driven off the crankshaft /5/ through gear transmission.

A suction strainer /7/ mounted on the suction stub of the oil pump is immersed in the lubricant. The oil delivered by the pump is forced through the edge-type oil filter and the main oil channel /9/ drilled in the side wall of the crankcase, whence it proceeds to the valve tappets and to the bearings of the camshaft /11/. The oil lubricating the tappets and cams reaches, via the bores of the tappets and the hollow pushrods /2/ the bushes of the valve-rockers /1/. Oil from the oil channels of the crankshaft passes through the bores of the journals and crankpins to the bearings and thence back to the sump. Oil passing through the oil channels of the crankshaft is forced through the rearmost bearing/6/ and the oil duct pipe /6/ to the oil pressure gauge, which accordingly will always indicate the oil pressure prevailing in the rearmost crankshaft bearing.

The lubrication of the piston and the gudgeon pin is effected partly by the oil vapours generated, partly by lubricant sprayed from the bearings of the crankshaft onto the cylinder walls.

In the lubrication system above described and shown in Figure __, a shunted lubricant fine filter is inserted to make lubricant filtration more properly. The lubrication system is tapped at "I" branching screwed into the channel /4/ leading to the oil pressure gauge, whence the oil reaches the lubricant fine filter located between the radiator cowling and the radiator and thence the filtered oil passes back via communicating tube mounted onto the side of the timing cover to the sump.

Edge-type oil filter

The filter element /17/ or the edge-type oil filter is made up of a batch of closely packed thin sheet metal discs /shown enlarged on the right in the Fig./ Oil is forced to pass radially through the narrow gaps between the discs, while impurities are retained on the periphery of discs. The filter element can be rotated around the vertical axis, while a stationary combed part /18/ whose thin lamelle project in between the filter discs, scrapes impurities off the filter element. The rotation of the filter element is automatically effected so that the lever /20/ actuating the shaft of the filter element provided with a ratchet is linked to the lever of the shaft of the clutch releasing fork and thus the filter element will be rotated every time the clutch pedal is depressed.

There are two spring-loaded valves in the edge-type oil filter housing, an overflow valve /14/ and a by-pass valve /15/. The overflow valve opens when an excessive amount of oil is delivered by the oil pump and the oil pressure in the

main oil channel exceeds the permissible maximum value /about 5 kg/cm^2 /. In this case the excess oil flows back through the open overflow valve to the sump./Fig. 10. right./

The duty of the by-pass valve is to ensure undisturbed engine lubrication by letting oil enter direct into the main oil channel without first passing through the filter element whenever the latter is clogged or, with the engine still cold the lubricant is of too thick consistence to flow through the narrow gaps between the filter discs /see central sketch in Fig.10./; with the engine hotting up, the lubricant gets thinner and can pass through the filter element, whose resistance accordingly decreases causing the spring to close the by-pass valve /see sketch on the left in Fig.10./

At each oil change drain the sludge collected in the bottom of the edge-type oil filter housing through the drain plug orifice.

At each oil change due at every 15,000 km simultaneously dismount the filter element and wash it in petrol. Having washed the filter element, blow out by air. At dismantling the filter element disconnect the linkage of the actuating lever, unscrew the four nuts securing the filter housing cover, remove the lockwasher and lift out the filter element. Re-assembling of the washed and ried filter element is effected in reverse order as outlined above.

The oil fine filter

The cylindrical filter element /14/ of the oil fine filter consists of a batch of alternately packed compact sheet of cartoon with radial holes, strained each another by three clamps. The oil passes through the inlet aperture /2/ on the side of the filter housing/1/ the filter, whence it flows through the gaps formed between the compact sheets and the radial holes from outward to inward the filter element. Having passed through the filter element, the oil leaves the filter housing via the bore of the centre screw /15/ and the outlet aperture. Impurities are retained on the outside of the filter element and in the flat places among the radial holes.

Every 1,500 km clean the oil fine filter. After having driven out the screw handwheel /7/, remove the cover with the cork packing /3/, the spring /6/ and the spring retainer /5/. After that lift out the filter element /14/ proceeding with special attention to avoid the spreading of the sealing parts placed on the screw.

Carefully wash out the filter element in kerosene, drain the sludge from the bottom of the filter housing through the drain plug orifice after the drain plug /18/ is screwed out. Next reassemble the filter in an order reversed to the dismantling.

The cartoon paper filter element may be not more than three times renovated by washing out. Reject the used filter element which has been cleaned already four times, i.e. whose washing coincides with the cleaning due at each second oil change, and replace it for new one. When replacing the new filter element remove the filter housing, screw out the centre screw /15/ and blow its bore /16/ by air. Rinse the filter housing in gas oil or in kerosene, next wipe until dried.

It is forbidden to bore the boring /16/ in the side of the centre screw.

Assemble the over-hauled oil fine filter in the following order:-

1. Screw in the centre screw /15/
2. Put on the lower felt sealing /17/
3. Put in the new filter element /14/
4. Put on the upper felt seal /13/, the packing gland /12/ in this the felt ring /11/, upon the latter the lock washer /10/ the packing gland spring /9/ and the small spring retainer /8/.
5. Put on the filter element the greater spring retainer /5/ and the cover spring /6/.
6. By means of the screw hand wheel /7/ screw on the cover to its place /4/, paying attention to the cork-sealing /3/ in its flange.
7. When reassembling the communicating tubes of the oil fine filter, care should be taken, that on each side of the ring communicating tubes a felt gasket ring be put on.

Maintenance of the lubricating system.

Check oil level in the sump daily with the dipstick. To this end, pull up the bus on level ground, remove the dipstick, wipe it dry with a non-fluffy, clean cloth and push it back fully to its place, after withdrawing the dipstick again, the oil level in the sump will be clearly visible on it. This should lie between the end of the dipstick and the engraved marking. There are some dipsticks having two markings the lower mark indicating the minimum, the upper one the maximum permissible oil level. Missing oil must be immediately replenished. Excessive loss of oil is to be traced to its cause and eliminated /faulty sealing, oil leakage etc./

Engine oil is to be changed periodically with a lubricant of specified quality, as detailed in the Lubrication Chart.

Oil change is to be carried out with the engine hot. In this case the used oil will be of a sufficient thin consistency to flow out completely from the engine.

Place a container of about 25 lit. capacity below the sump and having removed the drain plug, drain the lubricant from the sump to the last drop, then replace the drain plug complete with its gasket and tighten securely. Wipe the dipstick with a clean, non-fluffy cloth and replace it.

Pour fresh, clean oil /about 14 lit./ through a funnel with wire-gause insert into the oil filler hole and check

oil level, using the dipstick.

At each oil change drain the sludge from the bottom of the edge-type oil filter housing through the drain plug orifice / see Fig.10./

Every 15,000 km remove the sump and both the sump and the suction strainer of the oil pump wash out thoroughly with gas oil.

As to the maintenance of the edge-type oil filter and the oil fine filter, the tasks have already been discussed in the chapters ahead; "Edge-type oil filter" and "Oil fine filter".

If water leakage at the cylinder heads or oil seepage at the sump is observed, have the gaskets and seals replaced at a specialized workshop. When checking the oil level daily, ascertain that the lubricant is not contaminated by water. If any water is present in the lubricant, repair should be immediately accomplished at a specialized workshop as either the seals of the cylinder liners or the cylinder head gasket are to be replaced.

If blow-outs are observed at the communicating tubes of the exhaust collector pipe or the exhaust pipe, have the seals replaced for new ones respectively.

If unusual noises, knocks, hummings are heard during the operation of the engine, the driver must stop the vehicle immediately. Neglect of this may cause serious damages involving extensive repair jobs and considerable expenses.

FUEL SYSTEM

Fig. 12 shows the pipe network and the units belonging to the fuel system.

The fuel feed pump /4/ mounted on the injection pump /1/ sucks the fuel through the suction pipe /6/ and the first filter /5/ from the fuel tank and the fuel is forced to the fuel injection pump via the delivery pressure pipe /12/ and the two fuel fine filters /14/ connected after each another to the injection pump. Excessive amount of fuel delivered flows back to the tank through the overflow valve placed into the feed pump and the overflow pipe /11/. To the latter connects the leak-off pipe /20/ coming from the nozzle holder, too, the duty of which is to collect the fuel leaked through beside the nozzle needles.

Fuel tank:

The fuel tank of the bus IVECO 306 is installed below the floor at the rear seats of the vehicle. On its upper side there are four apertures; the filler hole provided with

the strainer, the connections of the suction and overflow pipes and the aperture for the fuel gauge member. At the bottom of the tank is a sediment trap /water pocket/ with drain plug.

One of the most important conditions of the sure and trouble-free operation for Diesel engine is the use of excellent, guaranteed quality, adequately settled and filtered fuel. For this reason at all times use a funnel with wiregauze insert, when filling the fuel tank and filter the fuel through non-fluffy cloth.

Drain water and sludge from the sediment trap at the bottom of the fuel tank weekly. Do never let the fuel tank evacuate completely to prevent the penetrating of air into the suction pipe, which would require the whole fuel system to be bled again.

Fuel feed pump

The fuel feed pump, mounted on the side of the fuel injection pump, is a plunger-type pump actuated by a cam on the shaft of the fuel injection pump.

The plunger /1/ of the pump is by spring /4/ pressed against the push rod /14/ lying against the cam. When running up the push rod to the cam, it pushes the plunger to the right, the delivery pressure valve /13/ placed into the plunger will open and the fuel flows from behind the plunger behind the delivery pressure valve, to the left side of the

plunger. At the next stroke the plunger is pushed by the spring to the left, the delivery valve will close and the fuel will be drawn by the plunger to the delivery pressure pipe /indicated by arrow/.

At the same time, new fuel is drawn by the plunger through the suction valve into the cylinder /to the right side of the plunger/. In case when the pressure in the delivery pressure pipe is overcoming the force exerted by the spring /4/, the plunger will remain on the right side and no fuel is delivered by the pump. This way the amount of the fuel delivered is determined solely by the force exerted by the spring, consequently this mechanism is ensuring the constant fuel pressure in the delivery pipe. Thus the amount of fuel delivered by the fuel feed pump to the injection pump is always as great as that required for the proper operation of the engine.

The hand pump /2/ mounted on the feed pump is serving to deliver fuel into the pressure pipe with the engine not working, a device for the purpose to facilitate the bleeding the fuel system.

The first filter, which is mounted on the feed pump, strains the fuel coming from the suction pipe through its filter element /6/. Impurities settled and one part of the water present in the fuel are deposited in the sediment trap /7/ of the pre-filter.

The first filter of the fuel feed pump is to be cleaned weekly. To wash the pump, unscrew the knurled-head screw /9/ of the sediment trap, push fixing strap /10/ aside

and remove sediment trap /7/ together with the filter /6/ and support spring /8/. Do not forget to pay attention to the gasket at the upper edge of the sediment trap. Wash the sediment trap and the filter gauze thoroughly in petrol, then reassemble the first filter.

To clean the suction valve /12/, proceed to make it accessible as follows; unscrew the slot-headed screw /11/ while the piston /3/ together with the pressure valve /13/ may be withdrawn from the cylinder after unscrewing closing plug /5/. Unscrew closing plug /5/ with attention so that the spring /4/ should not jump out.

The proper working of the fuel feed pump may be checked with the hand pump by fitting a piece of rubber hose in place of the suction connection and by dipping its free end into fuel oil. Another piece of rubber hose should be temporarily substituted for the pressure pipe connection. After hand knob /1/ is unscrewed, check the pump for correct working and screw back the knob.

Fuel fine filter

It is of utmost importance for the correct functioning of the injection pump that the fuel delivered to the pump should be free of any contamination. This is ensured by the fuel fine filters, serving to filter out the impurities left in the sedimented fuel and eliminate the air bubbles from it. Filtering is achieved by the felt inserts of the fine filter.

The two fine filters of the Bus IKARUS 306 connected after each another are attached to the crankcase on the rear side of the engine.

Fuel enters the filter housing through the pipe union /10/ on the left and passing through the batch of the felt filter elements /9/ superimposed each another from outside inwards, it leaves the filter through the central suction tube /6/ and lower outlet pipe union /7/. The central suction /6/ tube is provided with holes by means of which the filtered fuel can enter the central suction tube through the felt ring /9/ and the filter-gauze /13/ placed on the perforated cylinder. The spring loaded overflow valve /4/ which is mounted into the threaded pipe union of the overflow connection /5/ serves to save the filter housing from possible overloads. When fuel pressure is rising and overcoming the force of the spring, then the valve will open and releases excess fuel to return through the overflow pipe into the fuel tank. The same valve serves to bleed automatically the fuel system while the engine is running. As to the Bus IKARUS 306, these overflow apertures of the two fine filters are closed. The overflow valve as described above, is mounted by the manufacturing work on the fuel feed pump. The sludge drain plug /8/ is to be found at the bottom of the filter housing, while the bleeding screw /1/ is situated in the middle of cover-securing nut /2/.

Drain sludge collected at the bottom of the fuel fine filter weekly by slightly slackening and keep it open until the fuel let through by it will become clean.

If the amount of fuel flowed through decrease, but at latest every 1000 - 1500 km the pre-fine filter is to be washed out.

Wash out the second fine filter in the case when having washed out the pre-fine filter the quantity of fuel is still insufficient, but at least at the same time of rejecting the pre-fine filter element.

In this case the new filter element has always to be mounted in the second filter housing while the cleaned second filter will have to be placed into the first filter housing.

To this end, close the fuel pipe, plug of the fuel tank, unscrew cover-securing nut /2/ remove the cover /3/ and lift out the filter element /9/ from the filter housing. Unscrew the knurled-head screw /11/. take the element apart and press the separated felt layers one by one in clean, sedimented fuel and dry. Disassemble the outlet pressure tube union and unscrew the sludge drain plug /8/. Wash out the central tube and rinse the filter housing thoroughly. When reassembling place the thick and thin felt sheets alternately on the central tube, replace the damaged seals for new ones. After reassembling refill clean fuel into the filter through the closing screw orifice /12/ and bleed the device.

Reject filter element which has been cleaned already four times and replace it as the duration of life of such an element is lasting to such an extent.

Fuel injection pump with governor

The fuel injection pump although it is varied as to the make and performance, but working always on the same principle of operation, is designed for the duty that a quantity of fuel corresponding to the desired performance and of exactly defined quantity should be injected into the cylinders of the engine at a proper time.

The injection pump is driven off the crankshaft of engine by gear couple of ratio 1 : 2 and units four small plunger-type pumps /pump elements/ from which fuel is delivered to each corresponding engine cylinder. The length of the working stroke of the plungers, whereby the delivery amount of the pump element may be altered by turning of the plungers effected by means of a gear rack /107 d/. Adjustment of the gear rack and, by this the amount of the fuel injected is controlled by the driver by means of the accelerator pedal; the automatically actuating governor of the injection pump controls the stable r.p.m.; with the engine idling, in addition, when limiting the maximum r.p.m. of the engine, it tends to save the engine from overspeed.

The accelerator pedal is linked to the control rod /110 p/ of the pump. The gear rack will be moved by the control rod by means of the control lever /110 r/. On the control lever also flyweights /110 h/ are acting at the same time.

The injection pump is of vital importance for the proper operation of the engine, wherefore particular attention should be devoted to its maintenance work.

Oil level in the fuel injection pump is to be checked daily. To this end, withdraw the dipstick provided with two markings. The oil level should fall between the two dipstick marks; the top oil level is indicated by the upper mark and the oil level should not fall below the lower mark. Missing oil must be if necessary replenished through the aperture of the dipstick.

Every 3000 km fill 150cm³ fresh engine oil through the place of the withdrawn dipstick into the injection pump. In the meantime the used oil will flow out through the overflow pipe.

At the same time every 3000 km pour about 30 cm³ engine oil into the governor housing through the covered oiler /110 c/ on the top of the governor housing. About 15 minutes later unscrew the oil level plug /110 a, b/, drain the excess oil, then screw back the oil level plug. Retighten fastening screws, pipe unions, cross disc clutch bolts on the injection pump.

Every 6000 km dismantle the injection pump. Drain oil from the pump and governor housings, wash thoroughly in Diesel fuel, dry and refill with fresh engine oil, then reassemble.

It is strictly prohibited to damage the lead seals of the injection pump and later the adjustment accomplished by factory.

When damaging the injection pump should be taken but only to a specialized workshop for repair where after re adjustment it will be sealed again.

Considering that disassembling and reassembling, in addition adjustment of the injection pump may be on occasion an important driver's task, it is considered necessary to detail the maintenance rules in the following.

When disassembling the fuel injection pump, proceed as follows:-

1. Disassemble the pipes connected to the fuel feed pump and the delivery pressure pipes of the injection pump at the pump. In addition, dismantle the actuating linkage of the accelerator pedal from the injection pump.
2. Unscrew the four injection pump fastening screws. take off the round washers below them.
3. Push away the pump toward the fly-wheel until it will slip out from the clutch and take down.

When reassembling the injection pump, proceed in the following way:-

1. Before replacing the injection pump turn round the engine until both valves of the fourth cylinder being the next to the radiator will be closed /compression stroke, none of the valve rockers is supporting./ In this case the scale marked on the fly-wheel "B" indicating the commencement of injection will coincide with the pointer on the inspection hole of the clutch housing and the piston of the fourth cylinder is blocked before the top dead centre.

Injection pumps of different types require different injection angles. Thus the angle of the injection commencement for injection pump Type: Bosch amounts to 21° before the top dead centre.

A length of 3.66 mm measured on the outside periphery of the fly-wheel corresponds to an angle of 1° . When mounting a pump of another make, the commencement of injection should be accordingly altered at the mark "B" indication.

2. Turn the shaft of the injection pump so that the marking of coupling half on the pump should coincide with the mark "R" indication of the pump housing /Fig.16./ In this case the piston of the pump cylinder being the next to the drive is approximately at the commencement of the injection.

3. Put on the pump then the pressure pipes in this position onto the engine in an order reverse to dismantling, except the pressure pipe belonging to the piston being the next to the drive side which should not be reassembled, a while.

After having performed the above outlined jobs, the next thing to be accomplished is to adjust the injection pump with precision. As to this proceed as follows:-

1. Dismantle the side cover of the injection pump.

2. Set the injection pump by means of the hand filler governor at full filling and make to lift the first piston /on the side of the drive/ until the pressure stub will have been replenished with fuel full to overflowing.

3. Slacken the fastening screws of the cross disc clutch /Fig.16. 10./ Turn slightly the coupling half on the engine side opposite the working turning direction until the play between the teeth of the driving gear will be eliminated, at the same time catch by left hand the coupling half on the side of the pump to prevent its turning off. Then having kept by right hand the coupling on the side of the engine half in its position, turn slowly by one hand the coupling half on the side of the pump according to its working turning until fuel begins to overflow through the pressure stub.

4. Fasten in this position the cross disc clutch by its screws.

5. Reassemble the pressure pipe.

6. Bleed the fuel system according to the instructions

discussed in the chapter headed "Bleeding /airing/ of the fuel system".

7. Reassemble the side cover of the injection pump.

Nozzle holder and nozzle

The injection of the fuel into the precombustion chamber is accomplished by the pintle-type injection nozzles, which are projecting from the lower end of each nozzle holder. A number of nozzle holder of different make and performance is known and used. One of the best known is shown in Fig.17.

The nozzle holder is secured in the precombustion chamber by threaded sleeve /4/. The pressure pipe coming from the injection pump is connected to the inlet stub /15/. The fuel passes from there through the four very narrow gaps formed on the periphery of the filter stick /11/ and the bore of the nozzle holder housing /into the nozzle chamber/ /9/, of the nozzle /7/. The nozzle needle /6/ is pressed to its seat by spring /12/ through spindle /5/. Fuel leaking through past the nozzle needle flows back into the fuel tank through the leak-off pipe /14/.

At injection-phase, fuel delivered by the pump into the nozzle chamber /9/ lifts the nozzle needle /6/ from its tapered seat against the force of the spring, whereupon at

first only a very small quantity of fuel is injected into the precombustion chamber through the minute annulus around the pintle of the nozzle needle. Here it is ignited by the hot air while the rest of the charge, which is injected through the increasing cross-section made free by the lifted needle is sprayed into the already burning mixture.

The injection pressure depends on the pre-set force of the spring and this is accordingly adjustable by adjusting screw. The injection pressure required for the operation of the engine is 135 kg/cm².

Check weekly whether the nozzle holders are firmly in position, and if necessary, tighten them securely with hot engine.

If settled fuel is used and the fuel fine filter properly serviced, little or no trouble will occur with the nozzles. A faulty nozzle is revealed by the engine misfiring or knocking, by black smoky exhaust and by rising the fuel consumption.

To trace a faulty nozzle, slacken the pressure pipe unions of each nozzle holder one by one in turn. If the pipe union of a faultless nozzle is slackened, the r.p.m. of the engine will decrease. When slackening of one of the pipe unions does not cause any change in the r.p.m. of the engine in this case the nozzle fed by the pressure pipe is faulty.

In addition there is another way of checking the working nozzle with operating engine such as follows; screw out the hollow screw fastening the leak-off pipe /Fig. 17/ and put in a thin steel needles through the bore of the spring adjusting screw /3/ until its end will stop against the spindle /5/. If this feeler needle does not move, it is a revealing sign of a faulty nozzle.

Remove the delivery pressure pipe from the faulty nozzle; unscrew the inlet stub /10/, withdraw filter stick /11/ from it and clean carefully all the four grooves on it. Then remove the nozzle holder from the cylinder head; clamp nozzle union nut /8/ in a vice and screw it off; remove nozzle and withdrawn nozzle needle. Always refrain from touching the polished surface of the needle by hand and always hold it by its small pressure pin. To clean the nozzle and the nozzle needle, rinse them in clean fuel oil and remove oil coke deposits by means of a hardwood stick or by a piece of copper wire. /Do not use a steel tool for this purpose./ Be sure not to interchange the disassembled pieces, each nozzle is to be put back into its associated nozzle. If the clean nozzle needle is withdrawn halfway from the nozzle by gripping it by the pressure pin, it has to slide back to its seat by its own weight. New or repaired nozzles are to be cleaned from anti-corrosion grease applied to them before wrapping by rinsing in petrol before use. Before assembling, dip nozzle and nozzle needle in clean Diesel fuel. While assembling, pay attention that the annular slot between the nozzle and the securing union screw is even all round, otherwise the nozzle may get jammed. The thread of the union

screw must be faultless and its securing flange free from burrs.

Now refit the pressure pipe on the nozzle holder and check the working of the nozzle by rotating the engine with the starter motor. Give full charge with the accelerator pedal. If the nozzle emits a uniform, finely vaporized, conical spray, it is faultless and may be remounted into the cylinder head. If, however, the fuel issues from the nozzle in separate jets, or the tapet of the spray is not of regular shape, the injection is not abruptly completed or leakage is noticeable round the pintle, it is a case for renewal of the nozzle holder together with the nozzle.

Testing or repairing of the nozzle holder must take place in an enclosed, dustfree room under conditions of scrupulous cleanliness.

The injection pressure of the nozzle may be checked by means of a "top-pressure gauge /Fig.18./ While the engine is running.

The top-pressure gauge is essentially a nozzle holder with facilities for varying the tensioning of the nozzle needle spring by aid of an adjusting nut provided with a micrometer scale. The injection pressure reads on the scale.

Fit the instrument on the pressure pipe of the nozzle holder to be examined according to the Fig.19. The corresponding nozzle holder is to be removed from the cylind

head. With the engine running slowly adjust the instrument until the nozzle of the top-pressure gauge and the nozzle under test will inject at the same instant. If so, the injection pressure of the nozzle reads on the instrument scale. If, however, the top-pressure gauge is set to the prescribed injection pressure of 135 kg/cm^2 and neither the nozzle to be examined nor that of the instrument injects, this is an indication that the pressure prevailing in the pressure pipe is insufficient and consequently the fuel injection pump is defective.

To set injection pressure, clamp the nozzle holder, /Fig.17./ in a vice, unscrew the cap /2/ and by slackening the counternut /13/ give adjusting screw /3/ an inward or outward turn depending upon whether the injection pressure is to be increased or decreased.

After having adjusted, now tighten counternut, screw on cap, check injection pressure of the nozzle again and, if necessary, repeat the procedure until correct pressure is attained.

When using nozzle holders of another type, to alter the force of the spring and by this, the injection pressure change the quantity of shims past the spring retainer.

Bleeding the fuel system

The fuel system is to be bled, if;
the fuel tank has run completely empty of fuel;
a part of the fuel system /fuel injection pump, fine filter etc. /has been dismantled;/
Any of the pipes or pipe unions has been disconnected in any place, leakage has occurred in any part of the system.

The fuel system is bled by aid of the hand pump of the fuel feed pump, going step by step towards the nozzle holders as follows:-

1. To bleed the fuel fine filters, slacken the bleeding wing screw /Fig.14. 1./ of the first fine filter by a few turns. Keep pumping with the hand pump until bubble-free fuel emerges at the bleeding screw and tighten the screw, without stopping the pumping. After this the second fine filter is to be bled in the same manner as the first fine filter.

2. To bleed the suction chamber of the fuel injection pump, it is necessary to slacken both bleeding screws /Fig. 15. 10LS./ on the top of the injection pump housing by a few turns. Keep pumping with the hand pump till bubble-free emerges at the bleeding screws, then tighten the bleeding screws at continued pumping.

3. To bleed the pressure pipes, slacken the union screws of the pressure pipes on the nozzle holders. Set accelerator pedal to full charge and rotate the engine with the starter motor until bubble-free fuel emerges at the union screws, then tighten the nuts.

The pressure pipes may also be bled one by one, without rotating the engine, by removing the side cover of the fuel injection pump and actuating the corresponding pump element with a screwdriver till bubble-free fuel emerges at the union screws. For this reason, it is necessary to set the pump element corresponding to the pressure pipe to be bled on bottom dead centre.

AIR CLEANER

Air required for the combustion process is drawn into the engine through oil-bath air cleaner /Fig.20./ The air cleaner is direct located on the induction manifold below the engine cowling.

Air enters the cleaner through the aperture around the flange of the air cleaner and at high speed passes through the narrow gap between the bottom of the filter element and the lower part of the cleaner housing. Here the air is deflected suddenly, and hits the oil surface. By this the rougher dust particles submerge in the oil. Air, already cleaned to a considerable extent, passes through a fine metal sponge filter element together with the contained oil particles, where the fine dust left in it will be retained on the oily filter element. In the diagram the passage of air through the air filter is indicated by arrows.

Maintenance of the air filter

Having lifted off the cover of the air filter by slackening the three buckles, check oil level daily and, if necessary, refill oil.

Every 3000 km the air filters should be washed out. To this end, first remove the cover with the filter element and let oil drop out of the filter element. Then rinse filter element thoroughly in petrol to dissolve dust and impurities. Spray it with oil after drying. After that remove also the lower part fixed on the induction manifold by the connection-tube at the bottom of the filter housing and by clamp. Pour dirty oil out of oil container thoroughly and wipe with clean cloth. After reassembling, fill the bottom part with fresh engine oil up to the mark and refit the cover.

COOLING OF THE ENGINE

The power released upon the combustion of the fuel is not completely converted into useful performance, but most of it will be converted into heat. A part of this heat will leave the engine with the exhaust gases, another part will be absorbed by the parts of the engine. This part of the heat must be led away from the engine to prevent its overheating. This job is performed by the cooling water.

The cooling water is kept in constant circulation by an impeller-type centrifugal pump /1/. The water is pumped from the lower part of the radiator /2/ through the exit pipe /3/ and is forced direct into the water space of the crankcase. The circulating water will encircle the cylinder liners nearly in their full length and absorb from same the excess heat. From the water space of the crankcase the coolant will get through narrow connecting pipes into the water jacket of the cylinder head and, after further warming-up, reaches through the manifold /4/ and the connecting

pipe /5/ into the upper water chamber of the radiator. From there through thin-walled radiator pipes it will flow again into the lower water chamber cooling down in-between.

The streaming of the air through the radiator is ensured by the excess pressure, produced by the speed of the bus and by the fan, driven by V-belt from the end of the crankshaft. The feeler of the coolant telthermometer is mounted in the water outlet pipe of the engine, the instrument itself being arranged on the instrument panel.

The temperature of the radiator water may further be regulated through the radiator shutter to be adjusted by means of the actuating lever. /Fig.1. 11./ located in front of the driver's seat. The radiator shutter may be adjusted according to the outside temperature, that is, to the desired radiator performance between completely open and completely shut position. The working temperature of the cooling water may be adjusted by varying the extent to which the radiator shutter is opened. Radiator water temperature during service should be constantly at 75° ... 85°.

Maintenance of the cooling system

1. The cooling system should be always filled up by clean, filtered possibly spft water /rain-water, screened river water or water main water/. In case only hard well water is available, it should first be softened. Softening is carried out either through boiling or by dissolving 40 g caustic soda in 60 litres of water, leaving the solution to

stand for a time, and the filtering it. Hard water should not be used for the reason as the depositing scale will prevent the cooling desired for the engine and will clog the water ducts.

2. During service keep constant watch over the temperature of the radiator water. The temperature of the coolant should always be between 75 - 85°C and in no case should it rise above 90°C.

3. If the water is warmer than permitted, check whether the radiator shutters are not closed, or whether there is sufficient water in the radiator, /Check for water sickening through somewhere./ whether the ventilator belt is sufficiently tight, or whether the air channels of the radiator are not blocked. In the latter case clean the air-channels of the radiator by compressed air or by jet of water.

4. Add cold water into the radiator of the over-heated engine only gradually and with the engine running. Take care when opening the radiator cap that the ejected steam or hot water should not scathe your face.

5. Check the fan belt every day for tightness. V-belt tension is correct if upon average pressure exercised by the finger in the middle between the two pulleys on the right side of the engine, the deflection amounts to about 10 mm. If the deflection of belt should be more than 10 mm, proceed as follows:-

a. Release the fan axle nut.

b. Turn the belt tensioner hexagon screw clockwise until the fan belt attains the desired tightness.

c. Tighten firmly the fan axle nut.

If the belt excessively tightened, this will cause premature wear on the belt and ball bearings. On the other hand, a loose fan belt will slip. Thereby it will heat up considerably and wear out; it cannot drive the fan by the proper revolutions which will result in the radiator water and the engine getting overheated.

6. Grease weekly the fan shaft bearing.

7. Take care to protect the rubber connecting pipes from dripping of oil or fuel.

8. Twice a year, in spring and in autumn, remove the deposited scales /boiler scale/ from the cooling system by rinsing thoroughly. Moreover, rinse the radiator immediately upon arrival at the garage if on route, you were forced by some compelling reason, to pour hard or not quite clean water into the radiator. Use the following compounds for dissolving the scale /for rinsing the radiator/:

- a. Add 750 - 800 g caustic soda and 250 g kerosene to every 10 litres of water, or
- b. Add 1 kg of wash soda and 0.5 litre of kerosene to every 10 litres of water.

To remove the scale proceed in the following way;

Drain the water from the cooling system /with the engine cold/. Shut the drain tap and fill the radiator system with one of the above mentioned solutions. Start the engine and let it run at a medium r.p.m. /800 - 1000 r.p.m./ until it is heated up to working temperature, then allow it to stand with the solution in it for 10 - 12 hours. Afterwards warm the engine again in the above manner and drain the solution completely from the cooling system. Wait until the engine has cooled down perfectly and then rinse the cooling system thoroughly with clean, soft water. Continue the rinsing until clean water will emerge through the drain tap.

9. Grease the water pump every 500 - 600 by turning to the right the cover of the grease cup on it. Check at the same time whether water is not running through the drain hole on the pump housing. If considerable dripping been observed, this means that the sealing of the pump is already worn and it should be replaced. Refer it to a specialized workshop for repair.

MAINTENANCE OF THE ENGINE

Always keep the exterior of the engine clean as the properly cleaned engine will greatly facilitate the tracing of occasional defects.

Check screws, bolts, nuts and other fastenings for tightness as frequently as possible, and if any of them has slackened or come loose, tighten without delay, with the exception of the cylinder head studs, which are pre-stressed.

The maintenance of the single constructional parts is detailed below:-

1. Check every 3000 km clearance between valve stems and valve rockers and readjust if necessary. Clearance at all valves, with cold engine, should be 0.2 mm.
2. Check oil level in the sump daily. Withdrawn the dipstick at the bus pulled on level ground, dry with a clean

nonluffy cloth, then after having put in and withdrawn the dipstick repeatedly, check whether the oil level lies between the end of the dipstick and the mark on it. There are also dipsticks with two markings and when using them, the oil level should be between the two marks.

When checking daily the oil level, ascertain that the lubricant is not contaminated by water. In the latter case, refer immediately to a specialised workshop, as either the seals of the cylinder heads or the rubber gaskets of the water permeable units are to be replaced.

Change oil in the sump, at the intervals prescribed in the lubrication chart, with the oil of specified quality keeping in mind of what has been outlined in the chapter headed; "Maintenance of the lubrication system."

3. Check the radiator water daily and make up for evaporation losses by topping up the radiator. Perform the maintenance work of the radiator according to the instructions given in the chapter headed; "Maintenance of the cooling system."

If any leakage of water at the cylinder heads or seepage of oil at the sump be observed, have the gaskets replaced in a specialised workshop.

4. Check the V-belt tension of fan daily. Instructions for the deflection and its measure are given in the chapter headed; "Maintenance of the cooling system".

5. Should blow-outs be observed at the connections

of the exhaust collector manifold or the exhaust manifold, have the respective seals replaced.

Unusual noises, knocks etc. in the engine running are a case for stopping the bus at once and calling in an expert mechanic to make repair it. Disregard of this advice may lead to serious breakdowns involving extensive repairs and great expense.

Checking and adjusting the valve clearance.

1. Remove cylinder head covers.
2. Removing the heater plug conduits, unscrew heater plugs.
3. Set the piston at the ignition dead centre, to cause both valves to be closed /valve rockers are not under tension./
4. Slacken the counternut of the valve rocker adjusting screw and screw off the adjusting screw by about a turn, using a screwdriver.
5. Put a 0.2 mm clearance gauge between the top of the valve stem and the valve rocker and drive the adjusting screw inwards carefully until a slight resistance will be felt when trying to move the gauge.

6. Holding the adjusting screw in this position by the screwdriver, tighten counternut. Adjust all the eight valves in this manner!
7. Replace cylinder head covers.
8. Replace heater plugs and connect up conduits.

If the valves do not close tightly, - a shortcoming indicated by a drop in engine performance, have them reground at a specialized workshop.

CLUTCH

The function of the clutch /Fig.23./ is to interrupt connection between engine and gear box when starting and changing speed. The bus can be moved in case the engine has attained a certain speed /r.p.m./. Therefore, before starting, the connection should be interrupted between the engine and the gear box and this connection can be accomplished again when the engine is running with the required speed. Another function of the clutch is to ensure that the connection between the engine and the driven member, that is, the gear box should be gradually achieved, i.e. to compensate the difference of speed between the discs by friction and at last to enable a connection without slipping.

Engine torque is communicated to the flywheel /4/, whence it is to be forwarded to the transmission gear. This is achieved by pressing the friction disc /6/ of the clutch against the smoothly machined surface of the flywheel /4/. In this way the flywheel rotates the friction disc/6/, which is keyed on the shaft of the clutch /21/. The clutch fric-

tion disc is pressed against the flywheel through the pressure plate /3/ of the clutch by twelve clutch springs /2/ which are placed in the clutch cover /1/ screwed to the flywheel. To interrupt connection between flywheel and friction plate /to disengage the clutch/ the clutch pedal valve has to be depressed, causing the release bearing/17/ to move forward by aid of compressed air. The release bearing in turn pulls back the pressure plate by the intermediary of the release levers /15/ against the pressure of the springs. Thus the friction disc will be released from its rotation with the flywheel.

The engine of the bus IKARUS 306 is, as mentioned above, embedded in CETEFO type rubber bed and no mechanical connection can be accomplished between the engine and the clutch pedal fastened on the frame through the actuating lever of the clutch attached to the swinging suspended engine. Therefore, the manufacturing works provides pneumatic mechanism for actuating the clutch.

When the clutch pedal valve is depressed, the valve permits to pass air of great pressure /3,8-4 kg/cm²/ from the air reservoirs to the release cylinders of the clutch. When moving the plunger of the cylinder, the release lever fixed on the release shaft will be displaced and together with it the release bearing lying on the fork lever, thus the clutch will be disengaged.

The rod actuating the edge-type oil filter is connected to the lever of the release fork shaft. By each depressing the clutch pedal valve, the rod will turn off the filter element of the edge-type oil filter.

Maintenance of the clutch

Be sure that the clutch pedal valve has adequate free play. Wear of the friction disc tends to decrease the free play, which necessitates for clutch readjustment.

Every 3,000 km deliver a few drops of lubricant, through the oiler /16/ into the release bearing according to the instruction of the lubrication chart. Remember that excessive lubrication may lead to saturation of the friction linings with oil, consequently to clutch slipping.

For renewal of worn friction linings that will no longer permit of proper adjustment, refer to a specialized workshop.

The pneumatic control member of the clutch and that of the brake system is completely of the same construction, thus its maintenance should be performed according to the instructions given for maintenance of the brake system in the referring chapter following.

GEAR BOX

Description and maintenance of the gear box

The function of the gear box consists : to transmit force for the driving of the rear wheels of the vehicle at constant engine speed and by varying speeds enables the vehicle to proceed at a chosen speed as required by varying road and traffic conditions. This is achieved by changing the transmission ratio between the engine crankshaft and the rear wheels.

The gear box of the IKARUS 306 provides four forward speeds and one reverse.

The gear box is located in a cast-iron casing, suspended in rubber bed on the transverse beam at the front in two points, at the rear, however, in one point. The clutch is connected to the gear box through a short propeller shaft.

When changing speed, the sliding gears are pushed in to mesh with the corresponding gears by dog-clutch, that is, the particular gear is fixed on its shaft by lock of the dog clutch. The path of the power transmission in the gear box, with the different speeds engaged, is as follows:

1st speed: The selector fork of the 1st and 2nd speed pushes

the gear /A₁/ rearwards on the main shaft /1/ to engage its gear with the gear on the transmission layshaft/B₁/. The passage of the torque; input shaft gear /A₄/ -layshaft gear/B₄/ layshaft/3/ -layshaft gear /B₁/ -pushing gear of 1st speed /A₁/ -gearbox mainshaft /1/.

2nd speed; The selector fork of the 1st and 2nd speed pulls the gear /A₁/ forwards on the main shaft to mesh the dogs of the gear /A₁/ with the dog of the gear /A₂/ untight running on its shaft.

The passage of torque; input gear shaft /A₄/ -layshaft gear /B₄/ -layshaft /2/ -layshaft gear /B₂/ -the gear /2/ of the 2nd speed -pushing gear /A₁/ -mainshaft /1/.

3rd speed; The selector fork of the 3rd and 4th speed pushes the dog-clutch /4/ on the dog main shaft /3/ rearwards allowing to mesh the dog-clutch with the coupling dog of the gear /A₃/ whereby the shaft will be forced to rotate together with the gear /A₃/.

The passage of torque; input gear shaft /A₄/ -layshaft gear /B₄/ -layshaft gear /B₃/ -the gear of the 3rd speed /A₃/ -dog-clutch /4/ -dog-main shaft /3/ -main shaft /1/.

4th speed; The selector fork of the 3rd and 4th speed pulls forwards the dog-clutch /4/ in the dog-main shaft /3/ to engage its dogs with the dogs of the input shaft gear /A₄/ and thereby the primary gear /of the input shaft/ will be meshed with the main shaft /1/ -forcing the former to rotate together with.

The passage in torque; input shaft gear /A₄/ -dog-clutch/4/ -dog-main shaft /3/ -main shaft /1/.

Reverse speed; The selector fork of the reverse speed pulls the double reverse gear /H/ forwards on its separate shaft, so that one gear rim of it will be meshed with the layshaft gear /B₁/, the other gear rim of the double reverse gear likewise with the pushing wheel /A₁/ of the 1st speed. In this way the main-shaft will rotate in opposite sense to the input shaft.

The passage of torque; input shaft gear /A₄/ -layshaft gear /B₄/ -layshaft gear /B₁/ -double reverse gear /H/ -pushing wheel of the 1st speed /A₁/ -mainshaft /1/.

The gear for driving the speedometer is accommodated on the gearbox main shaft behind the pushing wheel /Fig. 1. 2./

The gear box requires particular attention as to its handling, but requires no special maintenance work except for the periodical oil change as described in the lubrication chart and for the systematic cleaning. If unusual noises, knocks are heard from the gear box, the bus is to be taken to a specialized workshop for checking and repairing without delay.

Selector rods and selector forks

/Fig. 29./

The pushing of the gears and the lugs of the fork is performed by three selector forks /4,5,6/ mounted on three selector rods /1,2,3,./.

The selector rods are moved by the driver by means of the gear lever located in the driver seat, in addition,

by means of the remote-control mechanism

When the gear lever is moved in cross transversely direction, the head of the selector lever /7/ mounted on the selector shaft /8/ will be fitted into the fork of one of the selector rods. This selector rod will be pushed forward or rearward when the gear lever and the selector shaft are moved by the driver longitudinally.

Remote control mechanism

/Fig.30./

The remote control mechanism transmits the movement of the gear lever (3) to the gear box, and this will be changed to the desired speed according to the gear lever movement.

The fork (2) mounted in the bracket (1) and the gear lever (3) performs the duty of a joint, ensuring the longitudinal and transversal displacement.

The gear lever (3) is connected to the gear box by link rod consisting of two parts (5 and 8), which is adjustable in longitudinal and transversal direction. When adjusting, slacken adjusting screws (7) for longitudinal adjustment diminish or add shims, for transversal adjustment, however, turn one of the two component parts of link to the desired position. After adjustment carefully tighten adjusting screws to avoid the misadjustment of the mechanism.

The gear lever (3) transmits its movement to the linkage through a ball joint lever (4).

The remote control mechanism if correctly adjusted, requires no special maintenance. Every 3000 km lubricate the lubricating points, oil the parts of joint

Blocking of the selector rods

/Fig.31./

The blocking is achieved in two directions. One of them is serving to fix the single selector rods in a neutral or any cut-in position. This way of blocking is accomplished by the upper balls /2/ and the springs /4/ so that they will sink into the grooves machined on the selector rods.

The other blocking provides to prevent the shifting of two different speeds at the same time. This duty is performed by the lower blocking balls /3/. Also on the side of the selector rods semicircular grooves are machined. The depth of groove of 2-2 selector rods is determined so that to displace the one selector rod the ball will be thrust to the bottom of groove of the other selector rod and thus having been blocked with the housing, it cannot displace.

PROPELLER SHAFT AND REAR AXLE

The gear box of the bus IKARUS 306 is not built together with the clutch, therefore, the power transmission between engine and rear axle is provided by double propeller shaft system.

The clutch is connected to the gear box by the so called front propeller shaft, the gear box to the rear axle by the rear propeller shaft /Fig.33./

The need for propeller shafts and universal joints is explained by the fact that on the one hand, the shafts of the clutch and the gear box are not in line, on the other hand, while the vehicle is running, the position of the rear axle, which is suspended on springs, is subject to continual changes owing to load and road conditions. The vibrations of the running vehicle and the above mentioned suspension on springs can cause also variations of length, which are also compensated by the propeller shaft.

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The shafts of the main units attached to the propeller shaft are parallel, or approximately in the same line, consequently the angular acceleration will be compensated.

The universal joints of the front propeller shaft are shown in Fig.34. The needle rollers are to be lubricated by the grease nipple being in the cross joint, the lubrication of the end of the splined shaft, however, is made by the grease nipple on the slipping hub. The end of the splined shaft is protected by cap /9/ provided with felt seals /10/ from dirt and dust.

The universal joints of the rear propeller shaft are shown in Fig. 35. The lubrication of this shaft is made in the same manner as mentioned above.

About every 3.000 km lubricate propeller shafts and universal joints according to the instructions of the lubrication chart prepared in the "Workshop manual for repair".

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REAR AXLE

The rear axle /Fig.36/ of the vehicle performs various duties;

- a. It carries the weight of the rear part of the vehicle;
- b. It divides the torque transmitted by the propeller shaft between the two rear wheels, driving them at the same time;
- c. It takes up the torque produced by braking;
- d. It reduces the speed of the vehicle when the retarding power of the engine is applied;
- e. The differential gear enables the rear wheels to rotate at different speed when the bus takes a curve.

The rear axle /1/ is made of pressed steel sheets. To the rear axle housing pressed of two halves assembled by arc welding are secured the steel bushes for bearings, the flanges for fastening the brake supports, the spring brackets and the rear cover provided with the oil filler tube.

Fitted in from the front, this rear axle housing holds the final drive and differential gear. The final drive consists of the driving pinion and crown wheel /5,2/, with Oerlikon type spiral bevel gears. With recent series driving pinion and crown wheel of Spiromatic "Eloid" teeth are also in use. The driving pinion is supported at the neck in two tapered roller bearings /7/, at the end in a cylindrical roller bearing /9/. The driving pinion may be adjusted longitudinally by shims of different thickness. The crown wheel is riveted to the differential housing which revolves on each side in an axially adjustable tapered roller bearing /11/.

The differential gear is of the conventional design with four differential planet pinions /12/ mounted on the two planet pinion pins /13/. The two differential side pinions /10/ are located in the differential housing. The ends of the axle shafts /8,28/ fit into the serrated hub of the differential side pinions.

The axle shaft of the vehicle does not carry weight it only transmits the torque to the wheel hub /23/. For this reason, the vehicle need not be jacked up when working on the axle shaft, as the weight is carried by the wheel hubs located on the tapered roller bearings and in this way with the bolts driven out the axle shaft may be withdrawn.

The wheel hub revolves on the two large-size tapered roller bearings /20,22/ and on the inner side is sealed by flange seal ring. The wheel hub carries the brake drum and the wheel disc, the latter is fastened by eight wheel hub bolts. The splined end of the wheel hub bolts is stamped into the bore of the wheel hub flange, this way the wheel hub bolts are secured against turning. The wheel hub bolts are fixed in their position by nuts each secured by centre punch. The brake support plate /18/ is screwed on the flange welded to the rear axle.

The interior of the rear axle forms a closed chamber. Overpressure and oil vapours caused by heating in operation have to be released. To this end, a small breather screw valve is arranged on the right and left side of the rear axle next to the spring brackets. The primary condition of proper functioning of this breather valve is to keep it always free from impurities. Otherwise, the clogged breather valve will increase the inner pressure and force the lubricant out through the seals.

Maintenance of the rear axle

Oil in the rear axle should be changed every 12000km /in case of a new bus also after the first 1.500 and 3.000 km./ Therefore, drain oil, while it is still warm, through the drain plug orifice provided at the bottom of the axle housing, then introduce fresh oil through the filter plug orifice on the rear cover. Lubricant level should reach the rim of the filler orifice.

Unusual noises or humming in the rear axle or its excessive heating up warn the driver to check the oil level in the rear axle. In case of any oil loss top up with lubricant. If no oil loss is observed or unusual noises are heard also after topping-up, take the bus to a specialized workshop without delay in order to trace and eliminate the cause. By neglecting this, serious damages may ensue to the vehicle.

When checking the breather orifice at routine cleaning at least weekly, ascertain that they are not clogged by impurities.

FRONT AXLE

The reversed Elliot type front axle beam of the IKARUS 306 is drop-forged of heat-treated "I" section precision-machined alloy steel. The king pins carrying the stub axles are pressed into the two ends of axle formed by the two reversed Elliot axles in that manner of tapered self-closing fit so, that because of their rigidity they seem to compose an integral unit with the axle.

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The upper part of the stub axle is supported in a detachable bronze bush, the lower part is fitted with bronze bush stamped into the stub axle. The vertical pressure is taken up by steel and bronze shims.

The track arms are screwed to the top of the stub axles. One arm of the left-hand two-part steering arm is joined by drag link through a ball joint, the other arm carries the track rod. The other end of the track rod is likewise secured to the track arm on the other side by means of ball joint.

Perfect operating safety of the vehicle, good road-holding and easy steering chiefly depend on the correct adjustment and proper condition of the front axle and the steering gear. Therefore, devote special care to these.

1. Camber angle.
2. Toe-in.
3. Angle of lock.
4. King pin inclination.
5. Castor angle.

To adjust Toe-in

For the maintenance of the front axle pay special attention to the correct adjustment of toe-in, /Fig. 37./ since toe-in is, as experience has shown, most liable to alteration in use and leads not only to premature and abnormal wear of the rubber tyres, but prejudices also the safety of driving.

Toe-in is the measure of the difference in the distance between the rear planes and the front planes of the front wheels. In the Fig. 1. distance "B" is smaller than distance "A". Generally, this distance is measured on the wheel rims which, however, may not give a reliable figure, as the wheel rim is often bent out of shape. More exact measurement may be performed on the machined rim of the brake drums.

To measure toe-in

1. Pull up the vehicle on level ground.
2. See that the weight of the vehicles bears on the wheels.
3. See that the vehicle is under full load.
4. Set the front wheels in "straight ahead" position.
5. Measure distance between the machined edges of the brake drums at stub axle level behind the axle beam.
6. Measure distance in front of axle at the same height between the brake drum edges.
7. The difference of the two values thus obtained gives the measure of toe-in. Toe-in is correct, if distance "A" is 0...3 mm greater, than distance "B".

When toe-in does not satisfy the above requisites, perform the adjustment as follows:

- a. The vehicle is situated as described above under 1 - 3. Press out of track arm the right-hand, removable ball joint of the track rod.

- b. Slacken the locknut of the track rod and screw the ball joint in or out depending whether the track rod requires to be shortened or lengthened.
- c. Assemble the unit provisionally to check toe-in. Repeat procedure until adjustment has been found correct.
- d. Correct adjustment being found, assemble the linkage with due care and tighten all unions.

Readjustment of front wheel hub bearings

If checking of the front wheels reveals undue play in one of the wheel hubs, readjust wheel hub bearings without delay to forestall their pitting or breakage.

To adjust front wheel hub bearings:

1. Remove wheel hub cap /Fig. 38. 16./
2. Jack up the front axle beam.
3. Remove cotter pin from castellated axle and nut /15/.
4. Secure tightened end nut with new cotter pin.
5. Fill hub cap with bearing grease and refit.

Maintenance of the front axle

The front axle requires no special maintenance work. Toe-in and readjustment of front wheel hub as described above, require routine control. Besides, maintenance of the front axle consists in routine lubrication, as described in the Lubrication Chart. If any trouble occurs, entrust repair to a competent specialized workshop.

Play of the wheel indicates excessive clearance between the races and rollers of the tapered roller bearings. To eliminate this, the inner race of the outside tapered roller bearing, which is mounted on the axle stub with a sliding fit, is to be pushed inwards by bringing the castellated axle end nut further down. The position of the castellated nut is, however, determined by the shims of different thickness under the "D" washer in front of the castellated nut. Hence, the nut cannot be tightened unless the aggregate thickness of the set of this shim is first reduced by diminishing their number or altering their combination. These shims are made in thickness of 1, 0,4 and 0,2 mm. Proceed as long as a shim set has been found that will fully eliminate play, without, however, causing jamming on the bearings. The cotter pin must fit the fully tightened nut and the wheel hub must be left to rotate freely.

To speed up adjustment, it is advisable to measure the requisite shim thickness with a gauge /Fig. 39./ designed for the purpose instead of proceeding by trial and error.

To apply gauge remove end nut, "D" washer and shim. Screw gauge on stub axle and tighten until bearings will run without play. Now insert the measuring pin into the bore of the gauge up to stop. Read required thickness of shim set on the scale. After removing the gauge, assemble and fit an appropriate shim set. replace the "D" washer and tighten the end nut.

STEERING

In respect of life and material safety of the passengers the steering gear /Fig.40./ may be perhaps regarded as the most important part of an automotive vehicle. Any trouble in the steering mechanism while the vehicle is running may cause accident. The importance of keeping the steering gear assembly in good condition and the need for careful checking and routine maintenance cannot be over-emphasized.

If the vehicle does not admit easy and safe steering if it does not "answer" the steering gear, there is in most cases some hidden defect in the steering gear which has to be traced and repaired without delay. Heavy steering, even if it does not derive from some mechanical fault, put undue strain on the driver and may thus lead to an accident caused by the exhaustion.

The steering mechanism has to ensure the easy steering performed without any strain; it has to prevent skipping of the wheels and take up the shocks on the wheels caused by

road unevennesses without having been transmitted to the driver. This type of steering is called "self-closing" steering mechanism. A completely self-closing steering assembly is rarely used in the practice as being insensitive, that is, the driver does not feel the contact with the road through the steering wheel. Therefore, the up-to-date steering mechanism is provided with an approx. self-closing construction.

The transmission of steering is given by the ratio indicating how many rotations of steering wheel are necessary to make rotate the steering level once.

The transmission ratio of Bus IKARUS 306 steering is 1:24, that is, while rotating the steering /worm/ shaft once the steering wheel would have rotated 24 times. It is said the steering wheel would have rotated for this reason, since the steering shaft does never perform a complete rotation in the practice, but being moved on a part of circular arc forwards and backwards. The steering shaft of the IKARUS 306 is rotating to such an extent that the angle described by the steering shaft amounts to 53.5° from the one extreme position to the other extreme, that is, it is corresponding to three and a half rotations of the steering wheel.

The steering mechanism of the Bus IKARUS 306 is mounted between the front axle plane on a bracket carried by the left side frame member.

Attached to the bottom end of the steering shaft /2/ is a globoid steering worm /11/ running between two tapered roller bearings /10 and 13/. In the forked end of the worm

shaft /8/ there is a double roller /12/ supported in needle roller bearing and in mesh with the worm /11/. When the steering wheel and along with it the worm is turned, the double roller turns the worm shaft /8/ accordingly while revolving around its own shaft.

Steering linkage.

The steering linkage consists of the drag link and the track rod. A ball joint rolled into the meeting ends of the drag link tube and the track rod tube forms an integral unit with the tube. The ball joints at the other tube ends, however, are screwed into the internal thread of the rod ends, thus the length of the track rod and that of the drag link is adjustable by turning the ball joints threaded in or out.

The ball pin /6/ is retained in socket /5/ by two ball cup halves /3 and 13/ which are held in place by spring /2/. Thus the adjustment of the ball cups is unnecessary since it is automatically ensured by the spring.

Every 1000 km lubricate the ball joints carefully according to the lubrication chart.

A worn ball pin or ball cup is easy to replace. Adjustment of the track rod has been described in the chapter headed; "Adjustment of toe-in."

Maintenance of the steering mechanism

The steering mechanism /Fig. 42 and 43/ requires to be adjusted if there is apparent some wear caused by the long service on it, revealed by backlash clearance /play/ between worm and roller. To adjust steering, the front axle should be always jacked up. In case the steering is properly adjusted, the play measured on the periphery of the steering wheel is 50 - 600 mm.

Should the increased play be caused by the worn Steering worm and steering roller, so the play will be eliminated when adjusting worm shaft in radial direction.

To adjust the worm shaft in radial direction, slacken the 6 nuts securing the shaft cover and slacken the counter-nut of the adjusting screw /Fig.40.7./ The drilled holes in the cover are 12 mm in diameter, while the studs only 10 mm, this way allowing the cover together with the embedded worm shaft to be displaced 1 mm each side. Within this margin the clearance between roller /12/ and worm /11/ can be set by means of the adjusting screw /7/. After adjusting tighten firmly cover securing nuts.

Readjustment of the steering mechanism should not go beyond eliminating backlash. Overtightening may cause the steering to jam particularly towards the limit positions. As a measure of precaution, turn the steering wheel to right and left in the course of adjustment.

After proper adjustment, tighten the counternuts of the adjusting screws, while holding the latter in position firmly by aid of a screwdriver.

In case the tapered roller bearings /Fig. 42. 11/ carrying the steering worm are worn, the play will be above the permissible, which results in longitudinal play of the steering column /1/. The position of the bearings is determined by the thickness of the shims sets /10/ found under the top and bottom covers of the steering-box. When readjusting, diminish the number of these shims accordingly to the wear size.

It may be a case but rarely happening, that the play of the steering will result from the longitudinal backlash play of the worm shaft /Fig. 40. 8./. To adjust, slacken locknut of the adjusting screw /4/ and readjust adjusting screw as required.

When correctly adjusted, steering resistance to turning the steering wheel is equal in all position. Proper adjustment may be checked with a spring balance as shown in /Fig. 41./

When checking, dismount the drag link from the steering arm.

The steering mechanism is properly adjusted in the case when to turn the steering wheel, a pull force of 0.4 - 0.6 kg is required.

The steering box should be topped up with drive grease.

Change lubricant solely when any reason compelling has forced to dismantle the steering.

SPRINGS AND SHOCK ABSORBERS

Front and back road-springs
/Fig. 44 and 45./

Both ends of the main plate of the front spring are bent back to form an eye. Each eye so formed is fitted with a bronze bush. The ends of the second plate are bent over the eyes of the main plate, enabling the bus to keep its course in case of accidental breakage of the main plate. The front end of the front spring is secured direct to the vehicle frame, the back end is, however, shackle-connected to it, as a facility for altering spring length. The three lowest leaves are not in contact with the upper part of the spring assembly when the vehicle is unloaded or under minor loads.

Accordingly, under minor loads it is the upper plates of the spring that do the work, while the rest only join in when a given load limit has been reached. This method of progressive suspension ensures uniform, soft suspension under varying loads.

Each side of the back part is provided with two springs.

The front end of the back main spring features an eye formed on the main and second plates. A pin passed through this eye fitted with a bronze bush secures the spring to a bracket on the frame. This pin transmits the pushing and arresting forces arising on the rear axle to the vehicle. Retained by a bolt against jumping out, the back end of the back main spring is straight and slides freely in the sliding shoe.

The auxiliary spring mounted on top of the axle housing is straight at both ends. With the bus unloaded, the ends of the auxiliary spring are free, while above a certain load limit they lie up against the rubber pads screw-fixed to the frame. Thus, under major loads the vehicle is supported by both springs. The arrangement ensures at the back that the vehicle without loads or under minor loads has a uniform and smooth travel similarly to the case of the divided front spring.

It is not the sole function of the springs to damp shocks caused by road bumps. As mentioned above, the vehicle frame is pushed by the springs whose duty is to transmit the forces and stresses arising upon acceleration and deceleration between frame and front, rear axle, moreover, the springs keep the front and rear axles in their relative position to the vehicle frame. The importance of the proper position and adjustment of the front axle components

has been pointed out in the paragraph on the front axle adjustment. Now, a broken, bent or twisted spring or worn bushes and pins will immediately alter the position of the front and rear axles. Therefore, should any trouble be observed with the front and rear axles, first of all check thoroughly the springs.

The shock absorbers
/Fig. 46./

Springs alone are not adequate to control the movement of the frame and body in relation to the unsprung axles. Road bumps transmitted by the springs to the frame may cause prolonged oscillations in the latter so as to make driving uncertain. Stiff, hard springs are strong and offer sufficient support for the weight of the vehicle, but they rebound too quickly and do not completely absorb the minor road bumps. On the other hand, soft, resilient springs absorb a great part of the road bumps, but will not give the vehicle sufficient support and swing out for a considerable time after rebound.

To ensure smooth operation, the two conflicting properties have to be reconciled in a spring design that provides soft suspension combined with adequate carrying capacity. For this purpose the tendency of the soft spring to oscillate has to be eliminated.

This is achieved by means of the shock absorber.

In the hydraulic shock absorber liquid is forced by means of pistons from one closed chamber into another.

With a choking mechanism arranged between the two chambers the flow-through of the liquid can be adjustably controlled.

The shock absorber is interposed between the frame and the spring. In case of a road bump when the spring is forced upward, the shock absorber does not offer any resistance, but when the spring rebounds, its velocity is limited by the shock absorber so as to prevent its self-oscillation.

It is known, the viscosity of the fluids varies inversely to their temperature, in other words, the lower the temperature, the higher the viscosity of the fluid. Moreover, the higher the viscosity of the fluid, the greater resistance it offers against being forced through a hole of a given section.

This means that in cold weather the inner resistance of the shock absorber will increase and tend to give a harder suspension. To avoid this, screw the control valve outward, this way increasing the cross section of the channel for liquid.

The clearances and the valves of the shock absorber have been designed for a specified quality and viscosity of shock absorber fluid, it is therefore recommended to use not other quality. This fluid of constant composition changes but very slightly its viscosity with the variations in temperature.

Do not use other shock absorber fluid as specified! The use of other fluids may adversely affect the

operation of the shock absorbers and alter their characteristics.

As to the shock absorbers of piston-type a cylinder closed at both ends and full of shock absorber fluid comprises a double faced piston in the middle of which the rocker lever of the shock absorber moves between two hardened thrust pads. The rocker arm is secured to the serrated outer end of the rocker shaft and the arm is horizontal when the piston is in its middle position.

This piston-type shock absorber is of the single acting type, that is, upon compression of the spring it will not impede the upward travel of the arm, since the left-hand part of the piston according to the figure is provided with no valve to prevent the free passage of the shock absorber fluid behind the piston. Upon spring rebound, the rock arm, being pulled downwards, tends to move the piston towards the right. This movement is, however, restricted by the valve mounted in the right-hand part of the piston which confines the reflow of the incompressible fluid to a small aperture. The size of the aperture and through it the damping effect can be controlled by adjusting the valve spring nut. The side of the shock absorber housing accommodating the valve is marked by a capital "H".

When mounting the shock absorber, be sure that at the rebound stroke the rocker arm of the rocker shaft travels towards the marked side.

The marking on the outer end of the rocker shaft

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indicates the piston position. If this marking is parallel with the longitudinal axis of the cylinder, the piston is in its middle position. With the vehicle at rest, the piston should invariably be in middle position. This is achieved by suitable fitting the rocker arm to the rocker shaft end.

Maintenance of the springs

Clean the springs in course of the routine cleaning and grease the spring pins every 1000 km according to the Lubrication Chart. At the same time, after washing, make sure that the springs are not broken.

Every 3000 km

1. Tighten nuts of spring centre bolts and securing bolts.
2. A spring that has lost its resilience or settled down permanently should be renewed or reconditioned at a specialized workshop.
3. Carefully check the eyes of the main plates holding the bushes, as in case of main plate breakage the second plate will still keep the bush in position so that the breakage will not be revealed by spring displacement.
4. Blow off the washed spring assemblies carefully cleaned with wire brush by oily kerosene.

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The shock absorbers require no special maintenance. Care should be taken for their routine cleaning and greasing of the rocker arm pins and spring pins at the same time.

In case the shock absorber should be filled up, proceed in the following way:-

1. Disconnect the rocker arm at link.
2. Remove filler plug from filler hole and remove gasket.
3. Pour shock absorber fluid from a thin-spouted can into the filler hole while moving the rocker arm slowly up and down. Continue to top up until the shock absorber housing is filled to capacity and no air-bubbles escape at the filler hole.
4. Renew gasket, screw in filler plug and tighten firmly.

To adjust the shock absorber correctly, proceed as follows; suspend a weight of 10 kg on the end of the rocker arm of the shock absorber and clock the time needed by the rocker arm to travel from its upper to its lower position. This should take at the first shock absorber 5 $\frac{1}{2}$, at the rear shock absorber 35...55 seconds according as the shock absorber is to be adjusted for soft or hard suspension.

At the shock absorber of piston-type the size of

the aperture, and through it the damping effect may be controlled by adjusting the valve spring nut. The side of the shock absorber housing accommodating the valve is marked by a capital "H", outside.

BRAKE SYSTEM

Description and operation of the air-pressure brake system

Foot brake:

The IKARUS 306 is provided with pneumatic two-circuit brake system acting on four wheels of the vehicle and with a mechanic hand brake applied only to the two rear wheels. The air-pressure two-circuit brake system is shown in Fig. 48.

The air-pressure brake system works as follows:-

The air compressor /1/ charges two air reservoirs/6/ independent from one another. One of the two actuates the rear wheel brake /9/, the other operates the front wheel brake /8/. The two reservoirs are connected by two air pipes /14, 15/ with the two-circuit pedal valve /21./ On depressing the brake pedal with a certain intensity the pedal valve opens and air of an adequate pressure passes through it. Hence, the air pressed through is directed towards the

brake diaphragm /Fig.57.8/ where the tappet of the diaphragm is displaced by the pressure exerted on the diaphragm. The brake cam /Fig.57.5/ turned by the tappet presses the brake shoes against the brake drum and this way, braking effect is produced.

The brake pedal is of reaction system /in double sense/ in such a way that;

1. The driver of vehicle feels power corresponding to the braking effect on the brake pedal.
2. The quantity and pressure of the air passing the valve corresponds to the force by which the pedal is depressed and the quantity of air will only be increased by more intense pressure exercised on the pedal.

The air pressure brake system consists of different single constructional units which, however, are interconnected by pipes. One part of these serve to deliver compressed air, others regulate the braking i.e. the pressure, quantity and distribution of the compressed air required for braking.

Air delivered by the air compressor /1/ enters the air bottle /2/, the filter of which retains most of the dust, water vapours and oil fumes in the air supply. From here the air streams through the air governor valve /4/ into the air reservoirs /6/.

The operation of the braking system may be checked

on the air pressure gauges mounted on the instrument panel. The white pointer indicates the air pressure in the air reservoirs, the red one indicates the air pressure used for braking on the brake actuating valve and in the brake chamber.

Main parts of the air-pressure brake system:

1. Air compressor /1/
2. Air bottle /2/
3. Air brake governor valve /4/
4. Air reservoirs /6/
5. Two-circuit brake actuating valve /21/
6. Brake chambers /8,9/
7. Air pressure gauges. The instrument is described in the chapter "Instruments."
8. Air pipes.

Air compressor

The air compressor /Fig.49/ is a single-cylinder piston-type pump. The crankshaft /5/ supported in ball bearings /12/ is connected by connecting rod /19/ with the piston /24/. The connecting rod is fitted with needle -

roller bearing /8/.

The detachable cylinder head /35/ incorporates two pressure valves /38/ and two suction valves /28/. The pressure valves are exposed to oil coke deposits in the hot air, therefore, they require cleaning at shorter intervals, than the suction valves. To this end, the pressure valves of the air compressor may be removed and cleaned, without the need to detach the cylinder head, while the suction valves may be demounted only after the cylinder head has been removed.

The pressure valve spring /37/ sits in the valve housing /36/ where it is protected from the hot air stream and the oil coke deposits.

The air filter /1/ located on the suction connection stub retains the impurities in the induced air and at the same time it damps the noise of suction.

The air compressor is driven off the camshaft of the engine through a pair of helical gears, the driven gear of which is keyed on the front end of the crankshaft /5/ of the air compressor. The lubrication of the air compressor is effected by the driving gears spraying oil from the sump. The oil gathers in the crankcase /4/ of the air compressor and is sprayed by means of a scoop attached to the bottom end of the connecting rod /19/. Excess oil flows back through the side opening to the engine, this way, oil level will remain constant in the sump of the crankcase.

Operation of the air compressor

1st stroke; suction. In its downwards travel the piston produces a suction effect which causes the suction valve supported by a weak spring to leave the valve seat by motion /downwards/, creating an aperture for the passage of air into the cylinder.

2nd stroke; compression. In its upward travel, the piston compresses the air and the rising pressure produced by the continuously operating air compressor closes the suction valve. When the pressure of the compressed air overcomes the resistance of the spring-loaded pressure valves /38/, these will open and admit the air stream through the auxiliary conducts into the air reservoir with constant air pressure of 4.8 - 5.3 kg/cm².

Maintenance of air compressor

For repair of the air compressor, besides the required maintenance, refer to a specialized workshop or call in an expert mechanic.

Every 12.000 km dismantle air cleaner /1/, rinse in petrol, spray with clean oil and refit. When using the vehicle on a very dusty road, it is advisable to perform this job at shorter intervals.

Have the pressure valves cleaned of oil coke deposit

every 12.000 km, the suction valves every 24.000 km.

Tyre filling bottle

The air delivered by the air compressor contains oil fumes and sometimes oil coke particles. The oil fumes damage the rubber hoses, the oil coke disturbs the operation of the air brake governor valve. These troubles can be prevented by a filter device located between the air compressor and the air brake governor valve and serving to retain the oil fumes and oil carbon particles. A change-over valve permits the filter to be employed at filling the tyre. That is why it can be called a tyre filling bottle /Fig.50/.

The tyre filling bottle incorporates two main parts; the upper housing /17/ with the change-over valve and the detachable lower housing /5/ with the filter element /15/.

Air delivered by the air compressor enters the bottle through aperture "a". The air stream passes the filter element, then is forced upwards through the filter, which retains impurities. These collect partly at the bottom of the lower housing, partly in the filter element.

Filtered air enters the inside of the supporting tube /8/ through the holes in the support tube, then streaming along, leaves the tyre filling bottle via orifice "b" through the air brake governor valve. In this position, the air compressor charges the air reservoir by direct action.

When locknut /10/ is removed from the charging stub, the tapet /7/, keeping the change-over valve raised against valve spring /2/ pressure, will drop back and the valve will close.

In this case, the passage of air towards orifice "b" is blocked, thus the air streams in the support tube /8/ downwards into the rubber hose mounted in the charging stub. With the locknut refitted, previous position will be established.

Prior to filling the rubber tyres, drain the impurities collected in the lower housing. The rubber hose may be fitted on only if clean air without vapours begins to escape through the charging stub.

To drain collected impurities, remove the winged nut /10/ and slacken the support tube by some turns with the air compressor operating by means of the hexagonal part /12/. When the sediment collected in the lower housing is thoroughly blown out by the compressed air, tighten the support tube and fit on the rubber hose. When at inflating rubber tyres the prescribed air pressure cannot be attained, valve spring /2/ or valve /3/ is defective.

Every 12,000 km dismantle the lower housing, detach the filter element, rinse the unit in petrol, dry and re-fit. Once a year the tyre filling bottle has to be removed, disassembled and thoroughly cleaned.

On dismantling the filter element check the safety

valve /14/ accommodated to the filter housing for being jammed or corroded. The safety valve serves to protect the tyre filling bottle from bursting, if much water is collected at the bottom of the housing or if the filter element is clogged in winter possibly by frozen water obstructing the upward passage of compressed air through the filter. In such emergencies, the air presses down the face of the safety valve and without having passed the filter it enters the air reservoir.

Air brake governor valve

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The function of the air brake governor valve /Fig. 51/ is to switch the air compressor over to idling as soon as air pressure in the reservoirs has reached the upper limit and switching it on again when air pressure has fallen below the lower limit. The top and bottom limits are 5.3 and 4.8 kg/cm² respectively. At top limit, the air brake governor valve blocks the air pipes between air compressor and air reservoirs, letting escape the air delivered by the air compressor into the atmosphere. During this period the air compressor works under no load and is allowed time to cool off.

The change is performed by the control valve /1/ as follows: The channel of the control valve communicates with the channel leading to the air reservoir. With air pressure in the air reservoir to the maximum value, compressed air lifts the control valve loaded by spring.

In this way air is free to enter the channel tow-

ard the control piston /5/ and displaces the latter. The extension of the piston presses down the idle valve /2/. The open valve connects the delivery duct with the atmosphere. At the same time, with the decrease of pressure in the delivery duct, the back-pressure valve /3/ will close, thus the air finds no way to escape.

Cut-in and cut-out pressure may be adjusted by slackening or tightening of adjusting screw /4/, proceeding in the following way:

1. Discharge the air reservoirs by repeatedly depressing the brake pedal.

2. Start the engine and with the engine cowling opened, watch the air brake governor valve to "blow off" as indicated by a hissing sound and read the value on the air pressure gauge. With the reading above 5.3 kg/cm^2 , slacken the adjusting screw; below 5.3 kg/cm^2 tighten. Keep on adjusting by trial and error till the hiss is audible exactly at 5.3 kg/cm^2 . At this point secure the screw with the locknut.

When the air reservoir has been discharged, with the decrease of pressure below the lower limit, the control valve will be closed by pressure exercised by the spring. When the air between the control valve and control piston has escaped through the aperture of the jet screw /6/, the spring forces the control piston back to its place and the idling valve /2/ will close. With the increase of pressure the back-pressure valve /3/ will open and the air reservoir begins to take the charge.

Every 12,000 km remove and clean jet screw /6/. After screwing on, adjust it with precision.

The functioning of the air brake valve may be checked by the air pressure gauge mounted on the instrument panel. The difference between cut-out and cut-in pressure may be $0.2 - 0.5 \text{ kg/cm}^2$, the time between cut-out and cut-in should be at least 1 minute.

Before dismounting valves discharge air reservoir by repeatedly depressing the brake pedal, till the air pressure gauge indicates pressure.

Air reservoir

The air reservoir attached to the bottom frame beams is connected by air pipes with the air pressure gauge and also with the brake pedal.

The air reservoir serves for storing compressed air in order to apply brakes repeatedly also with the engine cut-out, i.e. to reserve compressed air in sufficient quantity.

Check at proper intervals the faultless sealing of the pipe connections and the drain plug.

Drain the air reservoirs of condensed water every 2 - 4 weeks according to the weather. Before draining of condensed water discharge air reservoir observing the directives in the last paragraph of the foregoing section.

Pedal valve

Pistons /9/ sealed with rubber sleeves are located in light alloy cylinders /11/ of the two parallel-connected MCM-type pedal valves /Fig. 52/. With the pedal /6/ depressed by the driver, the pressure pins /5/ force down the pistons /9/ by means of spring retainers /2/ and strong springs /1/. The lower tubular extensions /12/ of the pistons, acting against the air pressure and valve springs /14/ open the valves /13/ and the compressed air passing through the valves will enter the front and rear brake chambers, /Fig. 9./ from the reservoirs. The passage of air is indicated by arrows in Fig. 5.

With the pedal released, the air pressure and valve springs /14/ close the valves /13/, the piston springs /10/ force back the pistons /9/ of the pedal valve system, the tubular extensions /12/ of which will be disconnected from the valves /13/ and the compressed air left in the brake chambers /Fig. 9./ passing via extensions /12/ enters the inside of the pistons, whence it escapes through the filter elements /8/. This process is known as blow-off. 126

To ensure quick and safe blow-off of the valve, in stationary position a clearance of about 2...3 mm should be allowed between the tubular extensions /12/ of the pistons and the valves /13/. On the upper end of the pedal plate the above clearance corresponds to free travel of about 25...30 mm. This means that the depressed pedal may

be freely moved on such a stretch before resistance is perceived or before the valves commence to open. The free travel of the pedal should be adjusted by means of the rear stop screw /3/. The front stop screw /7/ limits the depressing of the pedal.

In acting position of the pedal valve /Fig. 53/ the air coming from the air reservoirs forces the valves back to their seats, whereupon the brake cylinders are connected with the atmosphere.

On full braking /Fig. 54./ the brake pedal will be depressed to the front stop screw. To adjust the front stop screw, tighten it firmly after proper slackening of the lock. Next press down the pedal, till the brake shoes are pressed against the brake drums with total force. In this position of the brake pedal slacken the front stop screw until a clearance of about 2 mm is left, before the pedal is stopped.

With the brake pedal depressed, the extensions of the pedal valve pistons open the valves, at the same time the lower ends of extensions are pressed against the valve plates and obstruct the passage of compressed air tending to escape through the inside of pistons. On opening the valves the compressed air streams toward the air chambers and the braking system will be actuated. With the brake pedal released, the valves close again, the ends of the piston extensions are also disconnected from the valves, the air in the air chambers escapes via the extensions and through the inside of pistons, whereupon the braking will cease.

On partial braking /Fig.55./ the brake pedal will not be depressed to the stop, but it is kept in an intermediate position in such a way that the valves are allowed to open. With the valves opened, compressed air enters the air chambers and action commences.

However, at the same time, the compressed air exercises also pressure on the pistons, it compacts the "limit - ing springs" mounted on the inside of the pistons, however, the pressure in the pipes connected to the air chambers, consequently the braked state of the vehicle will be maintained until the driver releases the brake pedal.

Maintenance of the pedal valve

The pedal valve requires no special maintenance. Lubricate valve pedal pins on cleaning and chacking the pedal valve about every 6,000 km. At the sam time check whether the rubber protecting caps are faultless. Repair and adjustment of pedal valve are to be referred to a specialized workshop. Once a year before the cold weather sets in, it is advisable to have the pedal valve checked and cleaned. Once a week check the pipe unions under pressure by suffusing soapy water. If soap-bubbles appear when the pedal is depressed, tighten all unions.

Brake chambers and brake cam levers

Each wheel brake is provided with a brake chamber /Fig.56./ and at braking the air pressure in the chamber

turns off the brake cam which, on its turn, will press the brake shoes against the brake drum.

The brake chamber consists of two discs pressed of steel sheet, between the flanges of which hold an elastic rubber diaphragm /2/. The centre part of the diaphragm is supported by the tappet /5/ disc, while the other end of tappet is connected to the brake cam lever /10/ by means of clevis head and pin. In stationary position the diaphragm is pressed by the springs /6/ to the brake chamber cover. The brake line is joined to a threaded socket /1/ welded on the chamber cover. On braking the compressed air streaming into the brake chamber pushes the diaphragm together with the tappet to the right and the brake cam lever /10/ turns off the cam.

With the brake pedal released, the broke valve blows off, the pressure in the brake chamber ceases and the springs force the tappet and diaphragm back to their starting position.

The brake chamber with diaphragm is working properly when on full braking the diaphragm performs the smallest possible stroke, because the increase of stroke reduces the force acting on the tappet and the excessive deflection will greatly damage the diaphragm. Therefore, to ensure a proper braking effect and long duration of life of the diaphragm, it is important to readjust the brakes in consideration of the wear on the brake linings at short intervals. Readjustment is performed with the brake cam lever /10/ turned off on the brake cam shaft /8/. To this end, a spiral-gear

drive is installed into the hub of the brake cam lever, which incorporates the spiral gear // fixed on the brake cam shaft and the screw // supported in the brake cam lever. When turning off the screw by means of a spanner fitted on the square collar on the stem of the screw, the screw will turn on the spiral gear and the brake cam shaft will be turned off in relation to the brake cam lever.

On adjusting, turn the screw in a sense that will make the brake cam shaft turn in the same direction as at braking. Take care to leave a clearance between brake drum and brake shoe sufficient to avoid friction between the brake lining and the brake drum when the brakes are released.

On general checking of the braking system clean brake chamber and lubricate all parts requiring greasing.

Air pipes

The air pipes are seamless steel pipes of size 15x1.5 and 6x1 mm. The pipe unions are made without soldering. The pipes firmly attached to the frame are connected to the spring supported brake chambers by flexible metal hoses /Fig. 1. 8, 12, 14/ which are secured to the pipe ends by clamps.

From time to time check pipe unions and tighten slackened nuts. Leaks of pipe unions are best detected by applying soapy water to unions and connections. Escape of air is revealed by soap-bubbles. If after tightening the pipe nut leaking is continued, dismount the pipe union and

fit in new sealing.

If the pipe is cracked or broken, do not solder or weld the pipe, but install a new one.

Brake adjustment

The brakes will need adjustment when wear on the brake shoe linings has increased their distance from the brake drum.

This trouble of the vehicles provided with pneumatic brake system is revealed by the fact that upon pressing down the pedal, braking effect is perceived later than with brakes in proper working order and at the same time brake efficiency is unsatisfactory.

In such emergencies adjust the brakes. Brake adjustment serves to reduce the increased clearance between brake shoe linings and brake drum to the least possible extent.

Before proceeding to brake adjustment, check the condition of the parts concerned with and affecting operation of the brake system, notably the wheel hub bearings, steering gear and steering linkage, spring pins and shackles, shock absorber rocker arms. Make sure that there are no traces of oil on the brake support or on the tyres. Presence of oil or grease points to some defect in the wheel hub rubber-oil seal, allowing oil or grease to enter the brake mechanism. First remedy the fault then wash the brake in petrol, renew the brake lining if necessary. If the brake has

not been disassembled for a longer period, it is advisable to remove the brake drums, clean the brake mechanism and lubricate the moving parts with heat-resistant grease. Use lubricant sparingly to avoid the soiling of the brake drum through drippings of melted grease.

To adjust the brakes proceed as follows; /Fig.57/

1. Set the inflation pressure of all tyres at 5.25.. 5.50 kg/cm² as recommended.

2. Jack up both axles;

3. Slacken the locknut /1/ of the adjuster eccentric. The nut is to be slackened so as to ensure the free movement of the adjuster eccentric. The eccentric on the left is provided with right-handed nut, one on the right has left-handed nut.

4. Move the adjusting lever in the sense of wheel rotation.

5. While turning the wheel continuously, tap the adjusting eccentric gently with a hammer till the brake begins to engage. Now return the lever till the wheel is free to rotate without grating. While adjusting, knock at the brake support plate with a rubber or wooden mallet to bring the brake shoes into position.

It is of great importance to eliminate friction and grating, because this will cause heating-up of the brake.

6. Tighten the locknut firmly. Take care that the adjusting lever does not shift while the nut is being tightened.

After the locknut has been tightened, make sure that the brake drum is rotating without friction.

Perform the adjustment with all four wheels in turn.

Hand brake

The hand brake of the vehicle acts on the two rear wheels, actuating the same brake shoes as the air-pressure brake.

The working of the hand brake shown in Fig.56. is essentially as follows;

The hand brake lever /3/ is allowed to make a semi-circular movement in the I-II direction around the brake lever shaft /8/ supported in the brake support /7/ in the case when the press knob /1/ will be depressed by virtue of which the ratchet /5/ has been displaced from the toothed segment /4/. At the movement in the II. direction the extension of the hand brake /3/ pushes backward the pull rod /10/ and this way braking effect is produced.

The brake will be released when the knob on the end of the brake lever is depressed by virtue of which the ratchet has been displaced from the toothed segment. Thus by moving the brake lever in the I. direction the brake will be released. Then cease from depressing the knob on the end of the hand brake and the ratchet will be pulled back by the spring /2/ accommodated below the press knob to the toothed segment. This way the fixation of the brake lever has been accomplished.

Adjustment and maintenance of the hand brake

After adjusting the foot brake, also the hand brake /Fig.59./ should be checked and if necessary, adjusted in the following way:

1. The rear axle should be jacked up so that the rear wheels can be freely turned.
2. Pull in the hand brake lever until the ratchet /Fig.58./ will be fixed in the first tooth /4/ of the toothed segment fitted on the brake support /Fig.58./
3. Slacken the nuts of the pull rod tightening screws /Fig.59./
4. Turn the tightening screw /2/ until the rear brakes will begin to apply.
5. Then turn back the screws /2/ to such an extent that the rear wheels can be freely turned and no sounds can be heard from the brake drums, indicating friction of the brake shoes.
6. While adjusting care should be taken that the compensator lever /5/ keep its perpendicular position with respect to the pull rod.

C. Remove the jacks from below the rear axle and make a short road test to be sure the hand brake is working properly.

In course of separate maintenance works check the threaded ends of the pull rod whether the thread are not deformed. In the latter case replace the faulty pull rod or have the threads threaded again.

Take special care for cleaning of the hand brake system and grease especially the hinged parts weekly.

ELECTRICAL EQUIPMENT

A knowledge of all units of the electric equipment is of vital importance to the driver because it enables him to satisfy a primary condition of the proper using, safe driving and operation of the IKARUS bus 306, and to handle any part of the electric apparatus properly.

Although special skill and special equipment is required to repair the electric installations, nevertheless, the driver has to become familiar with the possible faults of the apparatus for instant location and minor repair in an emergency.

• Before any treatment of the electrical equipment will be detailed, it is considered necessary to draw attention to two points of paramount importance;

1. Interrupt the circuit before tackling any unit or wire in the electric equipment. Turn off the main switch or remove the corresponding fuse from the fuse box.

2. Keep away all metal tools from the battery to guard against short-circuit in the battery, thus averting fire hazard or damage to the battery.

The connection diagram of the electric apparatus is shown in Fig. 58.

Dynamo

Electricity is supplied to the bus by a D.C., shunt-wound dynamo of 24 V, the voltage of which is maintained at an approx. even value, independently of engine speed, by the automatic voltage regulator mounted on the instrument panel and the current relay switch. Thus, the current consuming units and the battery are always supplied with a current of uniform voltage. If dynamo voltage drops below the voltage of the batteries, the reverse current relay will automatically prevent the return of current from the batteries to the dynamo thus saving the latter from burning.

The driver of the bus may check correct connection of batteries and dynamo any time on the ammeter mounted on the instrument panel. When before starting the engine the key current switch is cut in with the key turned, a red control lamp /Fig.73. A./ will light up on the fitting table. After having started the engine, the light of the warning lamp will be of minor intensity, then with the charging voltage attained it will be extinct. Should, therefore, the control lamp light up with the engine running /at high engine speed r.p.m./ in this case the driver becomes aware of

of the situation that the batteries are not sufficiently charged, the current consuming units are consuming the current of the battery and will run out shortly.

In case only the warning bulb is burned out or the wire is disconnected, replace the bulb or have the disconnected wire repaired. In case of failure the dynamo is faulty and is to be repaired in a specialized workshop.

Maintenance of the dynamo consists in removing the cover band every 6000 km and checking the commutator and the carbon brushes. Replace the worn brushes and clean the soiled commutator with fine glass paper. Remove the dynamo every 12,000 km and have it checked and cleaned at a repair shop.

Refrain from using emery for the purpose. Do not grind a burnt or pitted commutator but send it to a specialized workshop for skimming up and undercutting of the insulation.

Starter motor

The 4 HP sliding rotor axial type starter motor operates at a voltage of 24 V. In the "off" position, the armature /rotor/ of the starter motor is held to the rear end of the housing by spring action. When "on", the auxiliary field coils begin to rotate the armature and pull it forwards, thus bringing the pinion gently into mesh with the fly-wheel gearing. In the second stage the main field coil is switched on automatically and the starter motor will exert its full torque bringing the engine into rotation. The starter motor

will rotate as long as the hand lever of the starter switch is on and will stop as soon as the lever is released. This is necessary to obviate single engine firing, which would throw the pinion out of mesh with the gearing when a cold engine is started.

Maintenance work of the starter motor is done simply by removing it every 12,000 km and having it cleaned and corrected at a specialized workshop.

Batteries

With the engine not running, the working of the signalling system and lighting equipment, the preheating and the starting of the engine largely depends on the condition of the batteries. Their handling and maintenance accordingly calls for scrupulous care.

The batteries of the IKARUS 306 are located on the left side of the frame in a covered battery box provided with a door outside to be closed.

The battery consists of lead plates filled with lead sulphate, insulated apart, and located in hard rubber casing. By the action of the charging current lead oxid will deposit on the positive-pole plates through the dilute sulphuric-acid electrolyte, while pure lead will be built up on the negative plates. Electrolyte concentration will increase by production of additional amounts of sulphuric acid in the course of charging.

Current consumption from the battery the discharge starts a reverse process, that is, a decrease in sulphuric acid concentration. This has to be repeated as long as the battery will break down by actions of other kind.

The bus has two batteries of 12 Volts, 105 amperes - hours, this means, the battery is able to supply current of 1 Amp, 12 V over a period of 105 hours, or 105 Amp. 12 V during one hour.

The handling and maintenance of the batteries is no time consuming job and does not require any particular skill. Nevertheless, the careful maintenance is of great importance.

Always keep the batteries clean and dry, smear the metal parts carefully with anti-corrosive grease.

Check the acid level of the battery /electrolyte/ weekly and top up with distilled water to keep the acid level invariably 10...15 mm above the battery plate.

Check the battery every 3,000 km and examine the protective coat of black pitch for cracks. Smooth over the cracks with hot iron or add some new black pitch. Measure the voltage of each cell by means of a cell-testing voltmeter. If the voltage of the single cells is 1,7 V or under, charge the battery; maximum permissible charging current is 10 Amperes. Short-circuited or defective batteries should be referred for repair to a specialized workshop.

As a routine maintenance job, remove the batteries every third 6,000 km and charge them with a current of 15 A

till the charging current and the density of acid is found to remain invariable for two hours. Now correct the specific gravity of the electrolyte by topping up with distilled water bringing it to 1,285 by the end of the charging. Next charge the batteries with a current of 1 Ampere for 10 hours

The degree of charging may be approximately determined from the density of the electrolyte or, more properly, from its specific gravity.

As mentioned above, with charging the battery the density by this the specific gravity of the electrolyte will increase and decrease with discharging thus providing indications as to the state of charge;

Measured on a faultless battery specific gravity of

1,285 indicate full and correct charge

1,20 indicate half discharge state

1,12 indicate discharge state

The freezing point of the acid drops in relation to acid concentration, consequently the discharged battery will freeze at a higher temperature. For this reason maintain acid concentration at the prescribed level in winter time.

If the specific gravity of the acid is	1,285	the freezing point is	-65°C
" " "	1,20	" " "	-27°C
" " "	1,12	" " "	-11°C

The specific gravity of the electrolyte is also influenced its temperature, accordingly the specific gravity gauges are calibrated for 15°C. Wherever possible, specific gravity should also be measured at 15°C. In case of impossibility, you will be helped by the table below to reckon specific gravity correctly;

If the temperature of acid is in °C	+ 4	the effective value is	
		less by 0,008 than that readed	
" "	+ 26	more by 0,008	" " "
" "	+ 34	" " 0,012	" " "
" "	+ 43	" " 0,020	" " "
" "	- 1	less " 0,012	" " "
" "	- 12	" " 0,020	" " "
" "	- 23	" " 0,028	" " "

The battery is best stored at a specialized workshop whenever the bus is put/of service for a longer period. During this time the battery is to be discharged and charged every four weeks.

Head lamps

The head lamp is provided with two bulbs, one for side-light /town light/, the other for main driving beam. The latter is the so called Bilux, that is a double-filament bulb, the main filament of which lies exactly in the focal point of the reflector, and thereby the light beam will be projected forward nearly horizontal to the road; the second filament lies slightly before the focal point, below which

there is a small reflection screen directing the light to the upper part of the reflector, wherefrom the reflector projects the rays of light downwards the road surface. In this way dipped light is produced. The driver can change over the driving beam to dipped light by means of a dip-switch press knob accommodated on the floor of the driver's seat.

To replace bulb burnt-out, remove the headlight door.

To this end, slacken the three shorter half-round screws /5/ securing lamp door /1/; turn the door slightly away until the screw heads can pass through the gaps of the lamp door, whereupon the headlight door will be lifted out together with the reflector /7/. When taking out the bulb socket /8/, at the same time you can take out also the two bulbs provided with bayonet holder catch. When refitting H-lux, care should be taken that the reflection screen should be below the filament.

The reflector /7/ is easily removable from the headlight frame. Clean the mat or vaporous reflector with clean buck leather or cotton waste and do not touch the polished reflector surface by hand.

Before refitting bulb socket /8/ clean socket contact surface and inner contact springs of the headlamp with glass paper.

Adjustment of the headlamps

Take care to keep up correct adjustment of the head-

lamps /Fig. 65 and 66./ in order to profit by their luminous efficiency completely for misadjusted headlights will project the rays of light upwards and sideways, leaving the highway unlit.

To adjust headlamps stop the bus loaded to the prescription on level ground, 5 metres from a white wall with the plane of the two headlamps parallel to it. Paint two crosses on the wall.

The centre of the crosses should be 5 cm below the height "M" of the headlamp centres from the ground. The distance between them should exceed the distance between the two headlamps' centres by 10 cm, while the two crosses should be at equal distance from the vertical axis of the vehicle.

To adjust the main driving beam /Fig. 65./ cover one of the headlamps and adjust the other so that the centre of the beam coincides with the centre of the respective reference cross. Handle the other headlamp similarly.

The adjustment of the dipped light /Fig. 66./ is correct, the straight borderline between dark and light falls at least 5 cm below the line connecting the crosses.

To adjust headlamps screw in or out the three /longer/ half-round screws /6/ supporting the headlamp housing /Fig. 6/. 4./ respectively.

While screwing in the lower screw /6/ the headlamp will swing downwards, by screwing out it, that is swinging upwards. When screwing in the side screw, the rays of light

will be deflected inwards, in the opposite case the puffing is outwards.

Fog lamps

The IKARUS 306 bus is equipped with two fog lamps besides the two headlamps.

The switching of the fog lamp is effected by means of the tumbler switch /Fig.73.16./ fitted on the switch-panel

Bulb change and maintenance of the fog lamp is done similarly to that of the headlamps.

Registration mark light

The registration number plate is mounted on the rear wall of the bus, in the middle below the window. In the upper horizontal part of the number plate rim it is the registration mark light fitted blindly which is made up of five tubular lamps placed beside each other. The registration mark light projects white rays.

To make a burned-out tubular bulb accessible remove number plate rim and replace it for a new one.

The registration mark light lights up, at the same time, when the vehicle assembly lighting has lit up by means of the main switch.

Tail lamp and stop light

At the rear wall of the bus below on the right and the left a lamp enclosing stop light in one housing is dropped in to the moulding lath and the bulbs are mounted in compartments separated one by one with three light limiters. The bulb in the middle compartment will light up when switching on the vehicle lighting and give red light through red glass according to the Traffic Regulations of the police.

The bulb in the inner compartment is illuminated when the brake pedal is depressed, warning by its bright red light signal through the glass the driver behind your vehicle you are about to decelerate or brake stop. The stop light lights up as long as the brake pedal is depressed.

If the stop light or the tail light fails to light, check the bulbs and replace for new ones as necessary. Replace the faulty stop light switcher.

Great care is to be taken to ensure the proper functioning of the tail light and the stop light, since it is demanded by traffic regulations as well as by the safety of driving. In the outer compartment of the lamp housing another bulb is placed providing a more intense light than that of the tail light to save the rear red lamp of the flashlight trafficator apparatus.

Flashlight direction indicator

Altogether six flashlight direction indicator /Fig. 67/ are mounted on the bus. Two of them are positioned at the front of the bus in approx. the same height as the headlamps and outwards from the latter, two of them are aggregated together with the tail light at the rear of the bus on the right and the left side /see the last paragraph of the chapter headed "Tail light and stop light" and two of them are accommodated in the middle below the window on the right and left sides of the bus.

The two front indicators are directing the light forwards, the rear one backwards and the side one forwards and backwards provide red light.

When the three-position swing switch /Fig. 73. 7./ is mounted on the instrument board below instrument panel is switched on from 0 position to the right and the left, accordingly the three right-hand or left hand lamps will be on, providing flashlight at the same time as the inserted switch called Bimetall starts to work.

The bimetallic switch works as follows; there are two plate springs inserted to the circuit and soldered of alloy hard steel, which have different heat expansion coefficients; by warming up the plate springs will be declined in the direction of the smaller heat expansion side, thereby interrupting circuit in the lamps and the filament.

When cooling the Bimetall switch, its original shape will be reestablished closing the circuit. Then the warming up begins again followed by interruption.

The Bimetall plate spring is warmed up by heating wire /6/ wound around it, as soon as current is flowing through it.

Interruptions and cuttings-in will continue at rhythmic intervals as long as the circuit will have been interrupted with the direction indicator switch cut in to 0 position.

The speed of the switchings on may be changed by means of an adjusting screw /7/ secured by locknut /8/ on the side of the Bimetall switch. When the adjusting and at the same time contact screw is screwed more and more inwards, the flashes will be more frequent, while screwing out, flashes will diminish. The switch is adjusted properly in case flashes would be between 80...100 per minute.

The rhythmic flashing of the warning lamps /2/ indicates the driver the proper functioning of the direction indicator.

After adjustment do not forget to tighten the counter nut under the head of the adjusting screw, slackened before adjusting.

If the contact screw burns in and thus the switch fails to work, clean the silver contact-breaker top soldered

into the end of the contact screw. For this purpose use completely fine abrasive paper /polishing paper./

Side lights

To indicate the width of the bus and at the same time its height two lights providing white light are mounted on both upper corners of the roof outside at the front and two lamps of red light are situated on both upper corner of the roof outside at the rear. These lights inserted to a common circuit light up by means of the main lighting switch at the same time whenever the lighting of the vehicle is switched on.

Internal lighting and signal lamps

Altogether nine roof lamps serve for internal lighting of the bus. Lighting of the passenger compartment is provided with 4-4 roof lamps placed in two ranges and a lamp fixed similarly on the roof serves to illuminate the driver seat. To light them up, use the three owing switches mounted on the switch board /Fig. 73. 19, 20, and 21./ The switch No.19 cuts in the roof lamp for the driver seat, 4-4 of the eight-lamps providing the lighting of the passenger space are coupled to a separate circuit in such a way that with the switch No.20 cut in only each second pair of the lamps will light up, while with the switch No.21 switched on the other two pairs of lamps will be coupled.

Each roof lamp is provided with two bulbs. In case

of bulb change to make the bulbs accessible, remove the lamp frame and the illuminating glassware together with it.

A staircase light is mounted on the perpendicular wall of the staircases at the passenger doors, which lights up whenever the vehicle lighting has lit up.

If the staircase light does not light up, check whether the bulbs are not burned out.

To ensure proper lighting of the destination /route/ panel, 5 tubular lamps are located in the inside of the destination box at the front and the rear. Cut in and out out is effected by means of the swing switch /Fig.73.17./ mounted on the switch panel.

Invariably replace a burnt-out bulb by one of the same type.

The warning lamps are placed on the switch panel /Fig.73. 4./ in the order following; right-hand direction indicator headlamp, charging control lamp, left-hand direction indicator.

Electric horn

The electric horn /Fig.6./ consists of an exciting magnet which is controlled by two interrupter contact points in the following way; when the electromagnet draws the anchor core inward, the anchor core disconnects the interrupter contact points and cuts out the circuit at the same time.

Thereupon the electromagnet releases the anchor core, but switches on the interruptor contact points once again. Afterwards this process is repeated quick successively. The sound of the electric horn is produced by the vibration of a diaphragm fixed on the anchor core. A condenser switched parallel with the interruptor contact points tends to prevent the formation of sparks and the burning-in of the interruptor points.

The pitch of the electric horn sound may be tuned by changing the distance among the interruptor contact points, with the distance increased the frequency will decrease thereupon the sound of the horn will become low.

According to the make of the horn, the tuning screw is located at different, but from outside accessible points.

The horn press-button is to be found on the steering wheel.

WINDSCREEN WIPER

Windscreen wipers /Fig.69./ are mounted on both windcreens of the bus.

The windscreen wiper arm is actuated by a small shunt wound D.C. motor placed before the driver seat above, through reduction gearing built into the engine. The windscreen wiper control for cutting-in and out is upon the engine itself.

The drive housing is factory-filled with lubricant in the course of assembly, hence the unit requires no special lubrication. To make the commutator and the carbon brushes accessible remove the cover.

From time to time cease from working the windscreen motor a while to permit of cooling the motor. Should the rubber wiping rod adhere to the windscreen, so lift slightly the arm from the glass. Replace hardened, deformed rubber road for a new one.

Every three months dismantle the wiper motor disassemble, check and clean it, then reassemble lubricated with fresh grease.

Fuel gauge

The fuel gauge /Fig.70./ offers the driver a convenient means of checking the amount of the fuel in the fuel tank at any time.

The fuel gauge consists of two parts; that is, the measuring unit arranged in the fuel tank, and the indicator unit or meter mounted on the instrument panel. /Fig.73. 2./

The float of the tank measuring unit floats on fuel level, in relation to which an associated arm varies the length of a resistor inserted in the circuit.

Through the voltage variations the fuel meter indicates the prevailing position of the tank measuring unit, of

the float, or in other words, the fuel level in the fuel tank. The installation only operates with the circuit switched on.

In case of operational trouble, repair of both the tank measuring unit and the indicator unit should be performed at a specialized workshop, because this job requires special equipment and skill.

Lighting, ignition and dip switches

The wire connection of the switches are clearly shown in the electric wiring diagram. Always take care to connect the numbered wires to the correct points. Generally, defective switches are not repaired, but exchanged. To avoid short circuit, it is advisable to remove the corresponding fuses before doing this.

Heater plug, heater pilot filament and heater switches /Fig. 71./

When starting the cold Diesel engine the heat produced by compression is not sufficient to ignite the injected fuel. The duty of the heater plug is to preheat air in the precombustion chamber and ignite the fuel particles sprayed on the filament in the course of the injection. The heater plug is heated up to 800-900° when the current is switched on.

The main parts of the heater plug are the plug body

and the filament made of resistance wire, the two ends of which are insulated by porcelain from both each other and the plug body. One end of the heater plug is connected to a screw spindle, the other to the jointing sleeve. The two wires are separated by porcelain ring from one another.

The four heater plugs are connected in series and in the same series also the heater pilot filament is inserted, which being heated at the same time as the heater plugs, indicates the driver the heating grade.

The voltage drop of each heater plug is 1,7 Volts with the engine running. The voltage drop of the heater pilot filament is 1,8 Volt. To avoid the burning of the heater plug and the pilot filament by overvoltage, it is necessary to connect in series still three heater resistance. The voltage drop of the heater resistance between the heater plugs No. 1 and No.2, as well as that of the heater resistance between the heater plugs No.3 and No.4 is 6 Volts for each of them. However, the voltage drop of the heater resistance between the heater plugs No.2 and No.3 is 3,4 V. with the engine running. The voltage drop /24 Volts/ of the heater circuit is identical with the terminal voltage of the batteries. The current intensity /amperage/ is 34-36 Amperes.

The heater plugs have not separate circuit, therefore if the heater pilot filament fails to be heated with the heater switch switched on, in this case one of the heater plugs is defective. To trace the cause proceed as follows; short-circuit successively the wires in and out of each plug while observing the pilot filament. The plug

at short-circuiting of which the pilot filament begins to glow, should be considered defective, being the heater filament of the plug burned-out, thus replace it. Heater plug should always be changed only with the heater plug of the same nominal voltage. This value is stamped into the plug body.

A burnt or broken filament in the plug is a case for having it repaired at a specialised workshop.

Maintenance of the heater plug consists in occasional cleaning which should be done as follows;

1. Disconnect wire conduit from plug head and remove plug.
2. Remove coke deposits from plug body and filament with fine rubbing brush, rinse in petrol and dry.
3. Refit plug together with a new gasket and tighten firmly. Reconnect wire conduit and secure with nut.

Be sure that the shape of the filament has not been altered during cleaning, else it may contact the wall of the precombustion chamber and burn out owing the short-circuit.

If the switch is defective fit a new one.

Signal bell, getting off signal

The bus is provided with three signal bell knobs fitted onto the roof of the vehicle in the middle line, placed in equal distance from one another. By means of this button the conductor can give the driver signal to be started or stopped. The signal bell is mounted on the instrument and fuse panel located below the instrument board.

In case of a brake down of the signal bell system check the corresponding fuse and if blown, renew it.

Have other bell troubles repaired at a specialized workshop.

Fuses

The circuits of the electrical equipment are provided by fuses of suitable load capacity. If any unit of the electric apparatus is short-circuited or the insulation of any of the wires becomes damaged and would thus cause short-circuit, the fuse blows and prevents burning of the wires or the coils of the particular units. Be sure that the suitable fuse is mounted wherever required according the connection diagram; always replace a blown fuse by a piece of wire or a metal strip.

Experience has shown that the unsuitable fuses which

do not blow under overloads, constitute the major fire hazard to vehicles. The fuses of the bus are accommodated in three separated fuse boxes below the instrument panel.

The order of connecting-up of fuses is shown in Fig. 72.

Main switch for freeing of current

A magnetic main switch is mounted in the space of battery box in order to perform the freeing of current centrally at a bus put out of service or subjected to assembly.

Considering the skill and handling aspects, the connection system is constructed so that the freeing of current can be performed by means of a knob located in the driver's cabin while the system, however is to be switched on when the hand bottom of the main switch in the battery box has been depressed.

This way serves to avoid to switch on the system without having checked the batteries and the main wires.

INTEGRAL BODY

The construction of the IKARUS 306 bus is of the chassis, integral type and all strains resulting from load, road shocks, acceleration and braking are borne by the complete integral body unit.

The engine, front and rear axle and all other mechanical parts are mounted on the rigid integral body frame.

On the bus two passenger doors and a separate driver's door are mounted to ensure the quick movement at getting on and getting off in the passenger compartment provided with comfortable seats the arrangement of which is very practical.

In the following chapters installations and equipments will have been discussed which are component parts of the integral body and not mentioned in the foregoing paragraphs.

Driver seat

To render the job of the driving the bus - which demands constant alertness as well as strenuous work - more comfortable, the driver seat incorporated in the IKARUS 306 has been made conveniently adjustable to the driver's stature.

Frame of the driver seat together with seat cushions and backrest may be slid forward and backward on the rails of seat. The seat can be fixed or released in the adjusted position by a small lever placed below the first part of the seat cushion. When turning the disc located at the front of the seat, the seat will be lifting or sinking. The backrest independently from the seat may be locked in the desired position.

If the driver seat does not admit of easy adjustment dismount it from the sliding rails, clean the rails, and smear the rails with ball bearing grease.

Driver's door

The driver seat is provided with a separate door. The door is secured to the body by two hinges, its opening is limited by strap. The front part of the window mounted into the door may be pulled out, while the rear greater part is of the window type, with lifting mechanism. Its opening

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and closing is made by rotatable handle.

Repair of the window actuating mechanism is to be performed at a specialized workshop.

Every 3,000 km lubricate the door hinges with grease delivered through the lubricating nipples. Wipe off grease emerged at the hinge by lubrication. If the lubricating nipple is faulty, /no grease emerges at the button of the hinges./ or there is no lubricating nipples on the hinge pin, withdraw pin halfway, grease it and drive it to its place. Wipe off excess grease.

At every third 6,000 km maintenance work lubricate the window actuating mechanism. To this end remove the internal cover plate, smear the moving parts of the mechanism with ball bearing grease, as well as the lifting screw, and refit cover plate.

Rattling of the door is an indication of wear in the rubber stop pads and accordingly a case for their renewal. Every 3,000 km apply some talcum powder to the rubber stop pads. At the same time every 3,000 km grease door lock and wipe its outside dry.

Wind screens, sun vizor

Both windscreen panes of the bus are made of splinter-proof glass, similarly to the other bus window and are opened by a mechanism /Fig. 1. 8./ actuated by handwheel. Above the window before the driver seat there is a colour

filter celluloid sun vizor /Fig.1. 4./ secured by ball joint. This is adjustable to the most adequate position desired by the driver, or when not using, it may be folded back lying upon the front wall.

Broken windscreen panes are to be replaced only for splinterproof panes.

Windscreen defroster

The windscreen before the driver seat of the bus is provided with defroster in order to prevent the precipitation of vapours from passenger compartment air in cold weather and ensure the clear sight of the road for the driver.

The warming /defrosting/ of the windscreen is effected by blowing hot air upon the wind screen. The hot air of the radiator is picked up by a shutter holder box placed in the space between radiator and engine and from here it is directed through pipe duct below the windscreen to a long, narrow gap parallel to the plane of the windscreen. The air overpressure produced by the ventilator is sufficiently great to blow adequate amount of air upon the windscreen through the box, pipe duct and gap. The front wall of the box is provided with shutter lock by opening of which the warming of the windscreen can be accordingly regulated between the completely cut-in or cut-out position as desired or as required. The actuating lever of the shutter mechanism is clearly shown in Fig.1. by No.11.

Side windows

The splinter proof side windows partly fixed, partly sliding are embedded in a light metal alloy frame and mounted into the side walls of the body. The frames are secured by screws from the inside. To change a glass, the screws have to be unscrewed to enable the frame to be lifted out. The sliding glasses move in velour-faced U-section rubber rails. A worn rail should be removed and renewed.

Comfort equipments

The manufacturing factory do the utmost to ensure the most comfortable possible travel of the passenger not only by accommodating cushioned, tubular-frame seats covered with artificial leather, but also provide its vehicles with a number of equipments serving to increase the comfort and agreeableness of passenger transport.

In the middle of the roof there is a vent hole. The opening of the plate roof window is controllable as desired in the course, in the opposite course, in a gill way or parallel to the plane of the roof so that front lever of ball end will be pulled backwards, the rear one will pushed forwards, or both levers are actuated at the same time. Below the open vent window there is a protecting plate placed parallel to the plane of the roof to protect the passenger from the rain and the disagreeable air currents.

Maintenance of the body

Maintenance of the body consists in routine cleaning, washing, subsequent carefully drying, maintenance of doors according to the instructions and in carefully tightening all securing screws of the screwed plates.

The engine space is made accessible by lifting the engine cowling after release the cowling-fastening rubber locks. When lowering the engine cowling, be sure its edges lie in the guide rails, to exclude oil vapours and engine noises from the passenger compartment. The plates lined with glass wool and the feltcover of the engine cowling provide perfect insulation.

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INSTRUMENT BOARD, INSTRUMENT PANEL, SWITCH PANEL.

INSTRUMENT- AND FUSE-PANEL

/Fig.73./

On the front wall of the bus, below the windscreens in the inner side an attractive instrument board is accommodated equal to the overall width of the vehicle.

The instrument board on the side before the driver seat accommodates the various instruments separately such as the combined speedometer and mileage counter /distance recorder/Fig. 1.2./ the instrument panel /Fig.1. 6./ and the switch panel /Fig.1. 9./. The instrument and fuse-panel /Fig.1. 11./ are fastened on the front wall before the driver seat, below the instrument board.

On the instrument panel there are the fuel gauge, the air pressure gauge, the telethermometer and the oil pressure gauge placed.

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The switch panel comprises the electric equipments required for the bus operation. The arrangement and function of the switches is clearly shown in Fig.73. by help of the explaining text.

The other component instruments of the electrical apparatus /voltage regulator, Bimetall switch, automatic switch for getting off, bell, fuses plug socket for hand lamp/ for which it is not required to have them handy at any time but it is necessary that they should be placed in a space easy accessible, are located on the instrument- and fuse-panel.

As to the instruments placed on the instrument-panel the fuel gauge has been already discussed in the foregoing, therefore, it should not be described again. The faulty fuel gauge replace for a new one.

Combined speedometer and mileage counter

The combined speedometer and mileage counter /kilometrage/ shows the prevailing cruising speed of the vehicle in km/h and the total distance covered in km. This latter is supplying a valuable information as to the need for routine maintenance the checking of fuel consumption, casting to be accomplished exactly.

The most common fault of the speedometer is the breakage of the flexible driving shaft. This is mostly due to the improper mounting of the shaft. If it is given a sharp bend the internal flexible shaft is exposed to excessive tress, leading to fatigue and ultimately to breakage.

Before renewal of the broken shaft, try to trace the breakage to its cause, and prevent its recurrence. Repair of the instrument itself, when damaged should be performed at a specialized workshop, while to change the flexible shaft, proceed as follows;

1. Unscrew the union screw of the drive shaft on the instrument and lift drive shaft end out of speedometer.
2. Proceed at the same way to remove the other end of the drive shaft which is connected by a union screw to the driving pinion in the gear box.
3. If the external pipe duct is undamaged and the drive shaft is to be replaced, pull it out of the flexible pipe duct, fit a well-greased new shaft in its place and remount the assembly.
4. If both the pipe duct and the drive shaft are to be changed, removed both and fit a new assembly. Care should be taken not to give the shaft a too sharp bend and keep it clear of any part of the vehicle. Use rubber supporting lugs, to protect the flexible pipe duct from wear.

To change a defective speedometer proceed in the following way;

1. Unscrew the union nut of the drive shaft on the instrument side and lift the shaft end out of the instrument.

2. Disconnect instrument lighting wire and lift out bulbs.
3. Slacken the retaining screws and lift out the instrument.

Air pressure gauge

The air pressure gauge is provided with two pointers. The white pointer indicates the pressure prevailing in the air reservoirs. The red pointer leaves its 0 position only by braking and indicates the pressure in the pipe duct, that is the braking pressure.

The only notice here is to be kept in mind; do not forget to watch permanently the instrument while driving, because an air pressure drop below the permissible minimum leads to a considerably reduced braking efficiency and ultimately to grave accidents.

A defective air pressure gauge should be immediately replaced. The air pressure pipes are connected to the gauge with union screws, the instrument is attached to the instrument-panel by a bride.

Telethermometer

The telethermometer indicates the temperature of the radiator water, which is to be continually checked in operation by the driver and kept constantly at the optimum

value /75-85°C/ by the adjustment of the radiator shutter.

The feeler of the gauge is mounted in the water outlet manifold of the engine. The feeler, a small container filled with a fluid of boiling point / e.g. aethylchloride/ is connected to the telethermometer on the instrument-panel through a thin pipe. The instrument incorporates an arc-shaped thin-walled tube /Bourdon tube/. A variation in pressure in the fluid causes anti-elastic bending of the tube, that is, extension or constriction. This movement of the Bourdon tube is communicated to the indicator needle of the instrument by a small gear wheel. With the coolant warming up, the fluid of the feeler evaporates. The pressure of the gas varies with the temperature of the radiator water, or in other words, the higher the radiator water temperature, the higher is the gas pressure. The resulting anti-elastic bending of the tube is increasingly more marked and the indicator needle accordingly registers a corresponding temperature value of the telethermometer scale.

Repair of the telethermometer should be performed at a workshop specialized direct for this repair. Devote Attention not to give a sharp bend to the pipe which connects the feeler to the telethermometer and to keep it unbroken and clear of other component parts of the vehicle. While working in the engine space, take care not to strain or damage the pipe.

Oil pressure gauge

The flexible hose of the oil pressure gauge is connected through the pipe union above the flywheel housing

/Fig. 8. 4./ to the oil channel of the crankshaft. Hence, the oil gauge invariably indicates that oil pressure which still exists in the lubricating circuit after the engine lubricating oil has passed through the main lubricating points of the crankshaft. The advantage of this layout is that any undue leakage of oil at the crankshaft bearings will be instantly revealed by a pressure drop registered on the gauge.

If the oil pressure gauge shows a pressure drop, stop the vehicle at once and trace the fault.

If the indication of pressure drop is due to a fault in the oil gauge pressure pipe, fit a new pipe. Unscrew pipe unions screws at both pipe ends and withdraw pipe. After mounting the new pipe check the unions for tightness to prevent oil leakage.

A defective oil pressure gauge /oil leakage from the instrument, oil under the glass, because the diaphragm is cracked etc./ should be changed without delay.

ROUTINE MAINTENANCE

Maintenance work listed below has to be performed at the prescribed intervals;

Daily Maintenance

To be performed after each shift with the hot engine.

1. Check fan V-belt for tightness and adjust if necessary.
2. Check oil level in air cleaner.
3. Check electrical equipment /headlamps, dipped beam, fog lamps, parking light, routine light, side-light, three circuits of internal lighting, registration mark and stop light of battery charging, passenger alighting, signal and staircase lights, direction indicators, signal bell./
4. Check efficiency of foot and hand brakes, adjust if necessary.

5. Check tyre pressure.
6. Check wheel nuts, tighten, if necessary.
7. Check air pressure pipes for air-tightness. If hissing noise is heard, trace and eliminate the cause.
8. Check brake fluid level in supply tanks.
9. Check passenger door actuating mechanism.

First maintenance

To be performed every 1,500 km with hot engine.

1. Perform the works detailed above under "Daily Maintenance".
2. Check fuel pipes for leakage, tighten unions, renew gaskets as required.
3. Drain sediment from fuel fine filter, tighten unions, if necessary, bleed the system.
4. Grease hinges of passenger doors, adjust, if necessary.
5. Wash fuel fine filter.
6. Check air reservoirs, air pressure pipes, brake fluid tank supply and pipes for leakage, repair if necessary.
7. Clean lubricant fine filter.

Second Maintenance

To be performed every 3,000 km with hot engine.

1. Perform the works as detailed under "Daily Maintenance and "First Maintenance."
2. Check valve clearance and adjust if necessary / to be performed with the cold engine./
3. Check securing nuts and bolts and tighten, if necessary. /Engine suspension, dynamo, air filter, radiator fastening, fan axle end nut, injection pump coupling. This latter must not be slackened! Observe adjusting marks! /
4. Check precombustion chamber, nozzle holder and heater plug nuts for tightness while the engine is hot. Retighten if necessary.
5. Check water pump seal.
6. Drain sludge from edge-type oil-filter.
7. Clean air cleaner, refill with fresh oil.
8. Clean filter element of the fuel fine filter in case of any trouble with fuel flow.
9. Check acid density in batteries, top up with distilled water if necessary, clean and grease poles. Charge the battery from mains if necessary.
10. Check toe-in.
11. Tighten spring shackles.

12. Check play of steering wheel /50-60 mm as measured on the periphery of the wheel /and check steering gear for easy and smooth operation.
13. Check steering linkage, screws, bolts, joints, tighten if necessary.
14. Check play on wheel hub bearings, and adjust, if necessary.
15. Drain water condensed in air reservoirs /more frequently in winter time./
16. Jack up vehicle at the front and at the rear, and spray graphited lubricant between the spring leaves.
17. Change oil in the engine.
18. Grease door-hinges, apply talcum powder to rubber stops.

Third Maintenance

To be performed every 6000 km with the hot engine.

1. Perform the works as detailed under "Daily, First and Second Maintenance".
2. Remove and clean valves of the air brake governor valve.
3. Check brake control valve.
4. Remove cover band of dynamo, check commutator and carbon brushes, renew brushes if necessary, clean commutator if dirty.
5. Clean fuel pump.

6. Change filter element of the lubricant fine filter.
7. Grease window lift mechanism /driver's door/.

Fourth Maintenance

To be performed every 12.000 km.

1. Perform works as detailed under Daily, First, Second and Third Maintenance.
2. Remove batteries, check and charge with conditioning charging as prescribed.
3. Wash filter element of air compressor air-cleaner, wet with clean oil, clean suction and pressure valves and valve seats.
4. Wash filter element of air bottle.

LUBRICATION CHART

It has been already pointed out in the chapters discussing the single constructional parts of the bus, how important the proper lubrication is for the increase of the life-time of a vehicle. Therefore, always keep in mind the instructions prescribed in the lubrication chart to ensure the most proper possible lubrication of the bus at all times. It is of great importance to apply always and everywhere the lubricant of adequate quality as specified below;

Lubricant	Quantity lit.	SAE grade	
		Summer	Winter
Engine	14		
Injection pump	8-10	E° at 50°C	6-8E° at 50°
Governor		DA 80	DA 50

Lubricant	Quantity lit.	SAE grade	
		Summer	Winter
Gear box	4		
Remote control box	0,25	35-50E° at 50°C	15-25E° at 50°C
Rear axle	8		C 30 C 20
Steering gear	0.75		
Shock absorbers	0,2	-3,5 -4,5 E° at 20°C	Freezing point at -40°C
	0,4	1,8-2,5 E° at 50°C	
Shock absorber fluid		heat and frost-proof quality drop point at 130°C min.	
Ball bearing grease		ZS 130	
Transmission grease			

Lubrication under tropical climates

In tropical climates, with temperatures above 30°C prevalent, the heat will thin the oil and grease in use considerably, with the net effect of increased lubricant consumption and oil seepage through the seals, as e.g. in the gear box, wheel hubs and crankshaft. Generally speaking, the thicker the lubricant, the higher temperatures it will stand up to. Accordingly rising consumption of engine oil in hot weather is a case for changing over the lubricants of higher viscosity. The same refers to leakage or seepage of lubricant through faultless seals in the gear box or at the rear axle. Also change to a grease of higher drop point for the lubrication of the wheel hubs.

LUBRICATION CHART

Intervals of lubrication.	Lubrication point	No. of lubrication points	Type of lubricant	Method of lubrication
1	2	3	4	5
Every 1000 km	1 Steering drop arm ball pin	1	transmission grease	grease gun
	2 Front spring front pin	2		grease gun
	7 Stub axle pin	4		grease gun top and bottom end
	8 Steering arm and track rod ball pin	3		grease gun
	10 Front spring rear pin and shackle pin	4		grease gun
	13 Rear spring front pin	2		grease gun
	3 Engine	1	Summer or winter engine oil	Top up to the upper lever mark. Check oil level daily or prior to longer rides. Renew change oil first 500, 1500 and 3000 km, then every 3000 km. With a lubricant of inferior quality in use change oil often.

Intervals of lubrication.	Lubrication point	No. of lubrication points	Type of lubricant	Method of lubrication
1	2	3	4	5
Every 1000 km	4 Air cleaner	1	Summer or winter engine oil	top up to level mark
	5 Fuel injection pump	1		Top up to the mark on the dipstick in the pump housing, to the level plug in the governor housing
	9 Starter motor	1		If it has point of lubrication deliver a few drops of engine oil through the snapcover orifice
	12 Clutch release bearing	1		A few drops of engine oil through the snapcover orifice
	6 Fan bearing	1	Ball bearing grease	grease gun
	14 Rear spring shoes	2		smear with grease
	15 Engine oil change	1	Summer or winter engine oil	With a lubrication of inferior quality in use change oil often

Intervals of lubrication.		Lubrication point	No. of lubrication points	Type of lubricant	Method of lubrication
1	2	3	4	5	5
Every 3000 km	16	Air cleaner oil change	1	Summer or winter engine oil	Remove and disassemble air cleaner
	23	Accelerator control linkage	2	Summer engine oil	Lubricate with a few drops of oil
	19	Gear box	1	Summer or winter gear box oil	Top to the level mark on the dipstick
	30	Differential gear	1		Top up to the level of the filler plug
	21	Cross piece and splined hub of universal joints	6	Summer gear box oil	Grease
	28	Hand brake rocker pin	3		Smear
	27	Hand brake pulling rod bearing	1	ball bearing grease	grease gun
	17	Water pump	1	Heat resistance ball bearing grease	Top up grease cup, tighten from time to time, or lubricate with grease gun
	37	Remote control rod bearing	3	Ball bearing grease	Grease gun

Intervals of lubrication		Lubrication point	No. of lubrication points	Type of lubricant	Method of lubrication
1	2	3	4	5	6
Every 3000 km	20	Shock absorber	4	shock absorber fluid	Fill in through the filler hole of the shock absorber while working the arm up and down
	32	Front wheel hub	2	Ball bearing grease	Remove hub cap, fill with grease
Every 6000 km	33	Hand brake intermediate shaft	2		Grease gun
	34	Remote control rocker	1	Summer gear box oil	Smear
	35	Remote control lever housing	1		Top up
	36	Hand brake toothed segment	1		Smear with oil
	29	Remote control linkage pin	2		Smear
	22	Hand brake pull rod, fork end pin	5		

The defect and its probable cause Remedy

2. Faulty crankshaft bearing or connecting rod bearing Have it repaired at a specialized workshop

Air brake governor valve governs on too great or too little pressure.

1. Faulty adjustment of air brake governor valve Adjust properly
2. Control piston is jammed or does not seal Check and renew faulty parts

Cut-in and cut-out takes too long time

1. Control valve does not seal Disassemble and grind valve
2. Clogged jet screw Clean

Cut-in and cut-out takes too short time

1. Leakage in the brake system See above
2. Air brake governor valve leaks Clean and grind idling valve and back pressure valve, if necessary, renew

The defect and its probable cause RemedyAir brake governor valve fails to switch over to idling, does not close properly

1. Cracked metal below Solder or exchange
2. Control valve does not seal Clean and grind out valve

Air brake governor valve fails to cut-in

1. Jet screw dogged Slacken and clean
2. Control piston jammed Disassemble, clean, renew faulty parts

Oil emerges at the blow-off orifice

1. Air compressor overheated See above
2. Oil refines in Diesel-engine clogged Clean conduct

Air escapes at the brake valve

1. In braking position, with the brake pedal depressed air escapes through the brake valve Disassemble, clean, grind valves, clean seats

The defect and its probable cause Remedy

2. In acting position /unbraked position/ air escapes through the brake valve See foregoing point

Tyre filling bottle fails to inflate tyres to the recommended pressure

- 1. Brake valve spring broken or weak Renew valve spring
- 2. Valve does not seal Grind or renew

Air brake chamber lets air escape on braking

1. Diaphragm does not seal Renew

Tappet of diaphragm returns too slowly or fails to return when brakes are disengaged Exchange spring or springs

Brake pulls to one side

- 1. Oily brake linings Clean or renew
- 2. Brake support plate loose Tighten screws
- 3. Faulty adjustment of bearings Adjust bearings
- 4. Uneven air pressure in the tyres Inflate tyres properly.

The defect and its probable cause Remedy

- 5. Inadequate brake lining Renew
- 6. Water in the brake drum Dry brake drum

Insufficient braking efficiency

- 1. Faulty adjustment of brake Readjust brake
- 2. Inadequate brake lining Renew
- 3. Oily brake lining Clean or renew
- 4. Water in the brake drum Dry brake drum

Varying braking efficiency

- 1. Faulty adjustment of brake shoes Readjust
- 2. Brake cover come loose Tighten screw
- 3. Brake lining inadequate Renew
- 4. Oily brake lining, partly dried Exchange
- 5. Brake drum deformed or too thin Adjust or renew brake drum

THE DEFECT AND ITS PROBABLE CAUSE: REMEDY:

ENGINE

Engine has no power

- | | |
|--|-------------------------------------|
| 1. No or insufficient compression | Regrind valves |
| 2. Injected fuel amount insufficient | Adjust injection pump |
| 3. Fuel feed equipment defective | See relevant chapter |
| 4. Air cleaner clogged | Clean |
| 5. Exhaust manifold clogged | Clean |
| 6. Overheating | See chapter headed "Cooling System" |
| 7. Lubricant oil of inadequate quality | Change oil, using adequate quality |

Engine has no compression

- | | |
|---------------------------------------|------------------------|
| 1. Inadequate valve clearance | Adjust valve clearance |
| 2. Valves leaking | Regrind valves |
| 3. Valves or tappets jamming | Repair |
| 4. Valve stems and valve guides worn | Replace |
| 5. Valve springs weak or broken | Replace |
| 6. Timing gear maladjustment | Check, readjust |
| 7. Cylinder head gasket blows through | Replace |
| 8. Piston ring broken or jammed | Replace |
| 9. Piston rings incorrectly fitted | Replace |

THE DEFECT AND ITS PROBABLE CAUSE: REMEDY:

Engine smokes and knocks:

- | | |
|--|--|
| 1. Injection pump injects too late /engine stalls when idling/ | Readjust /see instructions/ |
| 2. Cross disc clutch misadjusted or unduly worn | Readjust correctly or replace |
| 3. Injection pressure too low | Readjust |
| 4. Compression spring in nozzle holder broken | Replace and readjust |
| 5. Nozzle needle sticks in nozzle, fuel is injected without vaporization | Replace nozzle, clean, try out. Before mounting adjust correctly |

Engine runs erratically:

- | | |
|--|--|
| 1. Fuel fine filter clogged | Wash filter |
| 2. Fuel feed pump does not deliver | Clean or repair |
| 3. Air in fuel injection pump | Bleed pump |
| 4. Plunger of fuel feed pump sticks occasionally | Have it repaired at a specialized workshop |
| 5. Spring of fuel feed pump broken | Have it repaired at a specialized workshop |
| 6. Tappet rollers worn | Have them repaired at a specialized workshop |
| 7. Tappet roller sticks | Have it repaired at a specialized workshop |

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
10. Piston ring grooves worn	Replace piston
11. Cylinder liner worn	Replace together with piston

Undue wear on cylinder liner and piston

1. Unsuitable lubricant	Change oil
2. Lack of lubricant	Top up oil level
3. Impure oil, clogged edge-type oil filter	Change oil, clean filter
4. Continual overheating	Refer to chapter "Cooling System"
5. Piston ring incorrectly fitted	Repair
6. Jammed piston ring	Replace
7. Dust penetrates engine through air cleaner	Clean air cleaner, top up oil level.

Burnt valves or valve seats

1. Inadequate valve clearance	Readjust
2. Weak or broken valve spring	Replace
3. Incorrect timing gear adjustment	Check, readjust
4. Oil cokes deposits on valve seats and valve heads	Clean, regrind valve
5. Valve jamming in valve guide	Clean, regrind valve
6. Valve of inadequate quality	Use specified valves

FUEL SYSTEM

Engine will not start

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
7. Edge of valve head too thin	Replace valve head
8. Valve seat too narrow	Repair
9. Overheating	Refer to chapter "Cooling System"
10. Valve rocker jammed, valve left open	Replace or repair valve rocker

Valves jamming

1. Inadequate clearance between valve stem and valve guide	Repair
2. Weak or broken valve springs	Replace
3. Valve stem seized or soiled	Clean or replace
4. Tappet or valve rocker seized	Repair

Excessive oil consumption

1. Broken or jammed piston rings	Replace
2. Incorrectly fitted rings	Replace
3. Oil cokes deposits on oil control rings	Clean rings
4. Cylinder liner worn	Replace
5. Cylinder liner seized	Replace
6. Oil leakage at seals, at the crankshaft	Replace seals

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
1. Fuel injection pump does not deliver:	
a/ No fuel in tank	Fill up and bleed system /see instructions/
b/ Choked line, first filter or fine filter clogged	Clean, bleed
c/ Air in fuel injection pump	Bleed system
d/ Fuel feed pump does not deliver	Clean valves, seal suction pipe
e/ Plungers of injection pump worn	Have it repaired at a specialized workshop
f/ Accelerator linkage disengaged	Repair
g/ Gear rack or plunger jammed	Repair
h/ Fuel injection pump drive shaft broken or key sheared off	Repair
i/ Delivery pressure valve soiled	Clean /bleed system/
2. Pump begins to inject too late or too early:	
a/ Coupling misadjusted	Readjust /see instructions/
b/ Rollers and tappets worn owing to insufficient lubrication	Have it repaired at a specialized workshop
3. Pump misadjusted in relation to the top dead centre	Readjust /see instructions/

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
4. Nozzles do not work:	
a/ Nozzle needle sticks /check with feeler needle/	Remove nozzle holder and check in testing instrument. If it works satisfactorily, jammed at fitting nozzle. Refit and tighten evenly.
b/ Nozzle does not seal, scalling on the seat of nozzle needle	Wash, if seat damaged, replace
c/ Injection pressure too low, adjusting screw slackened, or spring broken	Set injection pressure, replace spring
d/ Delivery pressure pipe leaks	Tighten or replace
e/ Delivery pressure pipe broken	Replace /bleed system/
f/ Air in the system	Bleed system /see instructions/
Engine starts, but stops again:	
1. Fuel pipe choked	Clean and bleed system
2. Fuel fine filter choked	Clean according to the instructions and bleed
3. Overflow valve does not close	Check and replace
4. Air in the fuel injection pump:	
a/ Suction pipe damaged	Repair and bleed system
b/ Plug or bleeding screw slackened	Tighten and bleed

THE DEFECT AND ITS PROBABLE CAUSE:

REMEDY:

5. Fuel feed pump does not deliver:

- | | |
|--------------------------------------|--------------|
| a/ First filter clogged | Clean filter |
| b/ Valves soiled | Clean valves |
| c/ Plunger jammed | Clean |
| d/ Breather slot of fuel tank choked | Clean |

Low engine performance:

1. Fuel injection pump delivers inadequately

- | | |
|--|---|
| a/ Accelerator linkage too short | Readjust |
| b/ Stop screw of gear rack misadjusted | Readjust |
| c/ Stop screw of governor misadjusted | Readjust |
| d/ Pump element worn owing to unclean fuel | Temporarily increase travel of gear rack, so as to compensate for reduced delivery. Have pump elements replaced at a specialized workshop as soon as possible |
| e/ One or more of the adjusting sleeves worked loose and governor sleeves turned off | Readjust governor sleeves with marks fitting |
| f/ One or more of the delivery pressure pipes leaking | Tighten or replace as required |
| g/ Delivery pressure valve slackened or soiling between valve and seat prevents proper sealing | Remove valves, clean seats, tighten firmly |

THE DEFECT AND ITS PROBABLE CAUSE:

REMEDY:

- | | |
|--|------------------------------|
| h/ Delivery pressure valve leaking | Replace |
| i/ Delivery pressure valve broken | Replace |
| j/ Compression spring in nozzle holder broken | Replace |
| 2. Injection pump injects too early, engine runs hard | Readjust / see instructions/ |
| 3. Injection pump injects too late engine smokes | Readjust / see instructions/ |
| 4. Nozzle leaking | Clean nozzle |
| 5. Shape of fuel spray too wide owing to oil coke deposits | Clean nozzle |
| 6. Nozzle worn, fuel leaks through | Replace |

Uniform knocking in engine:

- | | |
|--|--|
| 1. Injection pump injects too early | Readjust |
| 2. Injection pressure of nozzle too high / possible the nozzle needle seized/ | Set correct injection pressure check nozzle |
| 3. when idling, every second pump stroke is hard, nozzles work only at every second stroke | Nozzle needle seized, or injection pressure too high |
| 4. Some of the cylinders working hard, owing to interchanging delivery pressure pipes | Check pressure pipes from pump to nozzle holder |
| 5. Fuel feed pump works noisily delivery pressure too high | Choked or narrow return pipe |

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
8. Delivery pressure valve or its spring defective	Repair or replace
9. Nozzle leaking	Clean or replace
10. Excessive difference in injection pressure between nozzles	Readjust nozzle pressure according instructions
11. Compression spring in nozzle holder broken	Replace and adjust
12. Delivery pressure pipe leaking or broken	Tighten or replace
13. Excessive clearance between pump driving gears	Repair, adjust clearance
14. Governor sticking	Have it repaired at a specialised workshop

Engine fails to develop maximum speed /r.p.m./

1. Governor spring broken	Have it repaired at a specialised workshop
2. Accelerator linkage short	Adjust linkage

Engine overruns: /maximum speed too high/

1. Maximum r.p.m. governor spring too tight	Readjust
2. Gear rack does not work easily or sticks	Have it repaired at a specialised workshop

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
3. Stop screw of governor misadjusted	Readjust

COOLING SYSTEM

Engine overheats:

1. Insufficiency of radiator water	Top up
2. Radiator shutter closed	Open
3. Ventilator does not revolve	Tighten or replace fan belt
4. water pump does not work	Repair
5. Cooling system dirty, clogged	Clean cooling system
6. Injection timing misadjusted	Readjust
7. Brake remain engaged	Readjust
8. Vehicle overloaded	Reduce load
9. No lubricant in engine /no oil pressure/	Top up and check

Engine runs cold:

1. Radiator shutter let open too much	Draw up shutter
---------------------------------------	-----------------

water loss of radiator:

1. Radiator leaking	Repair
2. Leaking at rubber hose connections	Tighten hose clips or replace for new hoses

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY.
3. Water pump leaking	Replace seals
4. Leakage at cylinder heads	Replace cylinder head sealing
5. Leakage at cylinder liner	Renew rubber sealing rings /change lubricant/

CLUTCH

Clutch slips:

1. No play of clutch pedal	Readjust
2. Clutch springs weak or not-resistant	Replace springs
3. Clutch disc lining worked loose, torn off or worn	Replace linings or clutch disc
4. Pressure plate or release lever jammed	Replace faulty parts
5. Oil in the clutch mechanism	Disassemble, wash, replace clutch disc lining

Clutch jerks / vibrates /

1. Clutch disc oil-soiled	Replace linings or refit new clutch disc
2. Splines of clutch disc hub or on shaft worn	Renew defective parts
3. Pressure plate or release lever jammed	Renew defective parts
4. Pressure plate engages in tilted position	Readjust release levers

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
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5. Rivets of clutch disc come loose	Clinch with new rivets
-------------------------------------	------------------------

Clutch rattle:

1. Release bearing unlubricated or worn	Oil or replace
2. Splines of disc hub or on shaft worn	Renew defective parts
3. Pilot roller bearing worn or seized	Replace
4. Rivets of clutch disc come loose	Clinch with new rivets

Clutch will not disengage:

1. Clutch disc deformed	Remove, align
2. Excessive play of pedal	Readjust
3. Clutch disc hub seized on shaft	Remove, repair, and renew defective part
4. Roller bearing on crankshaft seized	Replace

GEAR BOX

Noises in gear box:

1. Insufficiency of lubricant	Top up
2. Lubricant too thin	Change oil using suitable quality

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
3. Gears worn damaged	Replace defective parts
4. Bearings worn or damaged	Replace defective bearings
5. Speedometer drive pinion damaged	Replace
6. Noises heard from the gear box may also derive from the propeller shafts	Replace

Speed thrown out/slipping out/:

a/ 1st or reverse speed thrown out

- | | |
|---|---|
| 1. Gear teeth worn | Replace new gears |
| 2. Excessive clearance between twin gear and splines of the main shaft | Renew worn parts |
| 3. Ball bearings too worn, excessive play on gear box shafts | Renew worn parts |
| 4. Lock ring weak unable to lock coupling/selector/rod firmly; possibly edges of rod notches worn | Replace spring, ball and coupling rod as required |

b/ 2nd, 3rd or 4th speed thrown out:

- | | |
|--|-----------------------|
| 1. Coupling claws of helical gears askew worn | Renew defective parts |
| 2. Teeth of coupling sleeve worn | Replace |
| 3. Ball bearings too worn, excessive play on gear box shafts | Replace worn parts |
| 4. Lock ring weak, unable to lock the coupling rod | Renew defective parts |

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
firmly; possibly edges of rod notches worn	
5. Bushes of helical gears worn, excessive play on gear	Replace worn bushes
6. Longitudinal play on layshaft	Adjust with shims according to instructions

Difficult gear shifting:

- | | |
|--|------------------------------------|
| 1. Clutch does not disengage | Check clutch, adjust play on pedal |
| 2. Idling r.p.m. of engine unduly high | Readjust idling r.p.m. |
| 3. Remote control defective | Refer to the following chapter |

Lubricant leakage:

- | | |
|----------------------------|--|
| 1. Unduly high oil level | Check and drain superfluity |
| 2. Lubricant too thin | Change oil, using prescribed quality |
| 3. Untight sealing flanges | Tighten nuts. If this has no effect, disassemble leaking units, fit new gasket or smear with fresh liquid seal |
| 4. Worn oil seal | Replace |

Remote control mechanisms:

1. THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
1. Both speed position limits and shifting imperceptible. Gear lever can be moved around freely	
a/ Breakage in the mechanism	Check mechanism, replace broken part
2. Speed position limits imperceptible	
a/ Limiting springs broken	Renew broken part
b/ Limiting springs weak	Replace springs
c/ Adjusting disc works loose	Readjust and tighten securing bolts
3. Speed position limits perceptible, but some of speeds cannot be engaged	
a/ Adjusting disc misadjusted	Readjust adjusting disc
b/ Bolts worked loose	Arms on shafts come loose. Repair slackened fastenings
c/ Excessive play of joints in linkage	Replace joints
4. Speed change impossible:	
a/ Bushing of small crank axle worn out	Renew bushing
b/ Linkage misadjusted	Adjust with shims at adjusting disc
c/ Breakage in mechanism	Replace broken part

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
Rear axle:	
Noises in rear axle when driving:	
1. Alignment of spiral bevel pinion and crown wheel not correct	Readjust according to instructions
2. Inner tapered roller bearing of driving pinion defective	Renew bearing, align pinion and crown wheel
3. Pinion or crown wheel defective	Exchange
4. Differential gear tapered roller bearing defective	Exchange
Noises rear in axle when coasting	
1. Excessive clearance between pinion and crown wheel	Readjust according to instructions
2. Outer tapered roller bearing of pinion defective	Renew bearing, realign pinion and crown wheel
3. End play on pinion due to worn bearing or misalignment	Renew bearing if necessary or adjust pinion according to instructions
4. Pinion or crown wheel defective	Exchange
Noises in rear axle both when driving and coasting:	
1. Pinion meshes too deep with crown wheel	Add shims to ease mesh

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
2. Alignment of pinion and crown wheel too close	Re-adjust according to instructions
3. Bearing worn or damaged	Replace faulty bearing
4. Rear wheel hub bearing slackened or worn	Adjust or renew bearing
5. Pinion or crown wheel defective	Replace

Rear axle knocking:

1. Clamp nuts of axle shaft slackened	Tighten, replace the defective one
2. Thrust washers under planet pinions worn	Replace worn washers
3. Universal joint worn or slackened	Replace worn parts
4. Excessive clearance between pinion and crown wheel	Re-adjust according to instructions
5. Excessive wear on splined part of propeller shaft or in splined hub	Replace worn part

Lubricant leakage:

1. Leakage at the driving pinion	Replace sleeved and felt seal ring
2. Leakage at the wheel hub	Check vent valve of rear axle for clogging. Replace sleeved oil seal of wheel hub

THE DEFECT AND ITS PROBABLE CAUSE: REMEDY:

SPRINGS, SHOCK ABSORBERS:

Hard riding:

1. Springs unlubricated	Grease spring leaves and pins
2. Spring shackle seized	Remove, clean, fit new bush, if necessary
3. Spring clamp bolts slackened, spring shifted	Relocate spring, tighten bolts
4. Spring centre bolt broken, spring leaves shifted	Relocate spring, fit new bolt
5. Spring broken, vehicle frame sunk upon rubber stop pad	Fit new spring
6. Shock absorber seized	Install new unit

Vehicle "heavey":

1. Lack of fluid in shock absorber	Top up with fluid
2. Shock absorber does not work	Repair or replace as necessary

Springs clatter:

1. Pins and bushes worn	Replace
2. Spring clips come loose	Relocate and tighten
3. Shock absorber links worn or come loose rubber bushing worn	Renew faulty parts

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
4. Shock absorbers empty or worn	Replace
5. Rear spring shoes unlubricated	Grease spring shoes
6. Springs not lubricated	Lubricate
7. Spring bolts slackened	Tighten nuts under load

Front axle:

Steering:

a/ Heavy steering:

1. Insufficient lubrication	Lubricate
2. Steering gear tightly adjusted	Readjust correctly
3. Steering gear parts badly worn	Replace worn parts
4. Steering gear jammed while being mounted	Slack and mount correctly
5. Steering gear bracket bent or worked loose	Repair
6. Under-inflated front tyres	Inflate tyres to correct pressure
7. Misalignment of front axle /bend/	Measure and adjust
8. Steering worm bearings worn	Reset bearings

b/ The vehicle "rattles":

1. Front axle unlubricated	Grease properly
2. Front axle misaligned	Check and correct alignment

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
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3. Steering gear misadjusted	Readjust correctly
4. Steering gear fastening slackened	Tighten bolts
5. Spring broken or centre bolt sheared	Repair
6. Under-inflated tyres	Inflate tyres to correct pressure
c/ Road shocks on steering wheel:	
1. Uneven pressure in front wheels	Check and inflate as required
2. Steering gear set loose	Readjust correctly
3. Steering linkage worn	Replace worn parts
d/ wheels wobble:	
1. Front wheels /tyres/ unbalanced	Balance dynamically
2. Steering linkage worked loose	Renew worn parts
3. Excessive play in steering gear	Check adjust

Electrical equipment

1. Dynamo charging insufficient or lacking	
a/ Ventilator belt slackened	Tighten or replace
b/ Voltage regulator defective	Have it repaired at a specialized workshop
c/ Commutator soiled	Clean commutator
d/ Carbon brush seized or worn	Run over brush or replace

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
e/ wires broken or loose	Check
f/ Short-circuit	Have repaired at a specialised workshop
2. Dynamo overcharges /Battery comes to boil/	
a/ Voltage regulator faulty	Have checked at a specialised workshop
3. Dynamo rattles:	
a./ Fan belt faulty or broken	Replace belt
b/ Ball bearing damaged	Replace
c/ Setting of bushes incorrect	Set bushes correctly
d/ Coupling of water pump drive worn or loose	Tighten or replace

S T A R T E R M O T O R

Inadequate or no operation:

a/ Battery discharged	Check and charge battery
b/ Cable shoes slackened or corroded	Tighten or replace
c/ Parts of wiring corroded	Replace
d/ Brushes worn, commutator soiled	Clean or replace
e/ Commutator burn, worn	Repair by skimming up
f/ Carbon bushes seized	Clean, check spring force

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
g./ Bearings worn or damaged	Renew bearings
h/ Terminals of contactor burnt in	Clean with glass paper
i/ Discs of overload coupling slip	Clean, correct or replace as required
k/ Starter pinion worn	Replace
l/ Flywheel gear ring worn	Replace
m/ Starter switch faulty	Clean contacts, replace soft spring if necessary
n/ Short-circuit in one of the field coils or in armature	Have repaired at a specialised workshop
o/ Starter switch handle lever partly depresses switch, hence dynamo charges only one of the batteries	Readjust correctly

B A T T E R Y

Battery discharged:

a/ Dynamo does not charge	Check dynamo
b/ Charging cables loose or broken	Tighten or replace
c/ Insufficiency of electrolyte	Top up with distilled water
d/ Internal damage /short-circuit/	Have checked at a specialised workshop

THE DEFECT AND ITS PROBABLE CAUSE: REMEDY:

HEADLAMPS

1. Headlamp will not light up:
 - a/ Bulb burnt out Check and replace
 - b/ Switch defective Replace
 - c/ Fuse blown Trace cause, repair and replace fuse
2. Headlamp lights dim:
 - a/ Increased wire resistance owing to faulty wiring or loose contacts Check and repair
 - b/ Faulty earthing at headlamp Clean headlamp mounting
 - c/ Dimmed reflector mirror Have it silver plated or fit a new one
 - d/ Incorrect setting /beam pints to one side/ Readjust according to instructions
 - e/ Battery discharged Charge

FOG LAMP

1. Fog lamp will not light up:
 - a/ Bulb burnt out Replace with a new one
 - b/ Fuse blown Remove, trace cause, repair, change fuse
 - c/ Switch faulty Fit new switch
2. Fog lamp lights dim:
 - a/ Faulty earthing Clean lamp holder mounting

THE DEFECT AND ITS PROBABLE CAUSE: REMEDY:

TAIL AND STOP LIGHT

1. Tail registration plate lamp will not go up:
 - a/ Bulb burnt out Check and fit new bulb
 - b/ Fuse blown Trace cause, repair, and change fuse
 - c/ Contacts corroded Clean
 2. STOP light does not function:
 - a/ Switch defective Replace
 - b/ Bulb burnt out Replace
 - c/ Contacts corroded Clean
 - d/ Fuse blown Trace cause, repair, change fuse
 3. Stop light permanently lit up:
 - Chain or spring of switch broken or disconnected Reconnect or replace faulty part
- Internal lighting and Signal Lights
1. Internal lighting does not function:
 - a/ Bulb burnt out Replace
 - b/ Fuse blown Trace cause, repair, replace fuse
 - c/ Roof lamp socket contact jammed, no spring effect Remove and relocate
 - d/ Wires in roof broken Check and reconnect

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
Staircase Light:	
1. No light:	
a/ Bulb burnt out	Replace
b/ Fuse blown	Trace cause, repair, change fuse
c/ Switch faulty	Replace
Passenger Alighting Signal System	
1. Signal light does not go out after opening the door:	
a/ Bulb burnt out or fuse blown	Replace
b/ Switch faulty	Replace
c/ Relay switch faulty	Have repaired at a specialised workshop or replace
2. Alighting signal operates only while the press-button is depressed:	
a/ Relay switch faulty	Check and have repaired at a specialised workshop
Signal Bell	
1. No sound:	
a/ Bell cup and hammer in permanent contact	Turn off bell cup
b/ Wiring broken	Have repaired at a specialised workshop

2. Signal bell rings permanently:

a/ One of the press-knobs or the wiring is earthed or short-circuited Eliminate short-circuit

TRAF FICATORS

1. Trafficator not functioning:

a/ Trafficator switch faulty Check and replace

b/ wire broken or loose Check, repair

c/ Contact point in bimetallic switch burnt in Clean /see instructions

d/ Bimetal switch faulty Replace, have repaired at a specialised workshop

2. Trafficator not lighting up:

a/ Bulb burnt out Replace

Electric horn

1. No sound:

a/ Broken or loose cable Check and repair

b/ Fuse blown Trace cause, repair

c/ No contact at press-knob Clean

d/ Contact-breaker points burnt in Clean

THE DEFECT AND ITS PROBABLE CAUSE:

REMEDY:

- e/ Diaphragm cracked
- f/ Coil short-circuit

Replace with a new one
To be repaired at a specialised workshop

2. Weak or no sound:

- a/ Interrupter contact points burnt in

Fit new condenser, clean contact points

- b/ Diaphragm cracked
- c/ Horn mistuned

Replace
Tune horn

- d/ Insufficient contact at horn button

Clean
Tighten

- e/ Horn bracket slackened

Charge battery

- f/ Battery discharged

Repair, reconnect

- g/ wire broken at press-button

W i n d s c r e e n W i p e r

1. windscreen wiper does not function:

- a/ Switch faulty
- b/ Cable broken or loose
- c/ Fuse blown

Clean
Check, repair
Trace cause, repair

- d/ Motor short-circuited or gear broken

Have repaired at a specialised workshop

THE DEFECT AND ITS PROBABLE CAUSE:

REMEDY:

2. Windscreen wiper moves slowly:

- a/ Carbon brushes and commutator soiled
- b/ Cable thin or broken, drop of voltage caused by faulty connections
- c/ Blade not firmly secured to shaft

Clean
Check and repair
Tighten securing screw

F u e l G a u g e

1. Fuel gauge indicator unit does not function:

- a/ Indicator is not supplied with current

Trace wire breakage, repair

2. Fuel meter indicates less:

- a/ Float perforated

Repair float and replace

3. Fuel meter indicates more:

- a/ Resistor wire slipped out
- b/ Resistor wire earthed
- c/ Resistor wire broken

Check, reconnect
Check, eliminate earthing
Fit a new one

S t a r t e r a n d b a t t e r y s w i t c h

1. Switch operates unsatisfactorily or not at all:

- a/ Contact shoe burnt in
- b/ Contact springs non-resistant

Clean
Renew switch

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
Heater Plug	
1. Heater plug does not glow:	
a/ Battery discharged	Charge battery
b/ Cable broken or loose	Check and repair
c/ Switch faulty	Replace
d/ Filament of pilot burnt	Renew
e/ Resistor coil burnt or loosened	Tighten or renew
f/ Heater plug filament burnt	Replace heater plug

I N S T R U M E N T S

Speedometer	
1. Both speedometer and mileage counter fail to function:	
a/ Flexible drive shaft broken	Replace/trace cause/
b/ Union screw of flexible shaft unscrewed	Refit and tighten
c/ Inner mechanism of instrument damaged	Have repaired
d/ Flexible shaft driving gear faulty	Replace in gear box
2. Speedometer alone fails to function:	
a/ Inner mechanism faulty	Have repaired at a specialized workshop

THE DEFECT AND ITS PROBABLE CAUSE:	REMEDY:
3. Distance recorder alone does not function:	
a/ Inner mechanism of kilometrage faulty	Have repaired at a specialized workshop
Oil pressure gauge	
1. Oil pressure gauge does not function:	
a/ No oil pressure	Stop at once, check engine and oil pressure gauge.
b/ Pressure pipe broken	Fit a new pipe
c/ Leakage at union screw	Tighten union screw
d/ Instrument defective	Replace
Telethermometer	
1. Telethermometer indicates less or not at all:	
a/ Radiator water cold	Draw up radiator hood cover
b/ Telethermometer faulty	Replace
Air pressure gauge	
1. Air pressure gauge does not function:	
a/ Compressor does not deliver air, no pressure in the air reservoir	Check compressor, repair

THE DEFECT AND ITS PROBABLE CAUSE*	REMEDY:
b/ Leakage at pipe unions or pipe connections leaks	Tighten union screws check pipes for tightness with soapy water, replace defective pipe
c/ Bourdon tube of gauge cracked	Fit new gauge

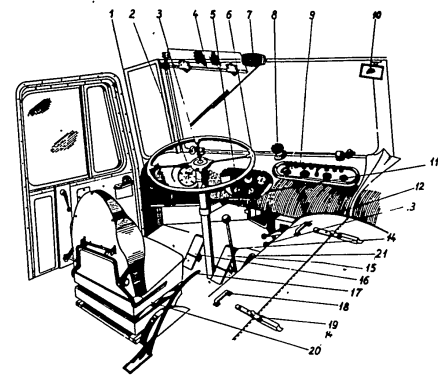


Fig.1. Driver's seat and equipments for driving
1.Warning lights 2.Combined speedometer and distance recorder 3.Horn press-knob 4.Sun visor 5.Direction indicator switch 6. Instrument panel 7.Windscreen wiper 8.Handle for opening window 9.Switch panel 10.Inner rear-view mirror 11.Instrument board 12.Hand accelerator pedal 13.Governor lever for radiator shutter 14.Gear lever 15.Brake pedal 16.Clutch pedal 17.Hand brake lever 18.Lifting handle for engine cowling 19.Frog lock 20.Driver's seat 21.Accelerator pedal

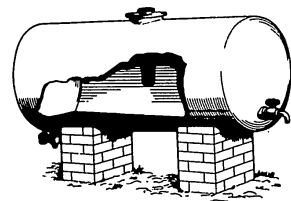


Fig.2. Fuel tank

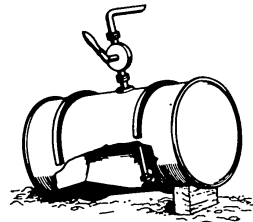


Fig.3. Storing fuel in barrel

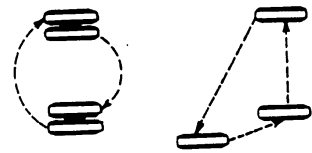


Fig.4. How to change tyres

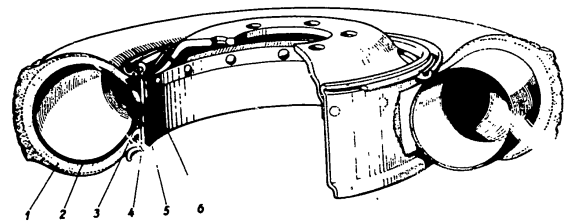


Fig.5. Wheel rim with rubber hose
1.Tyre 2.Hose 3.Protecting strip 4.Wheel rim 5.Side ring
6.Closing ring

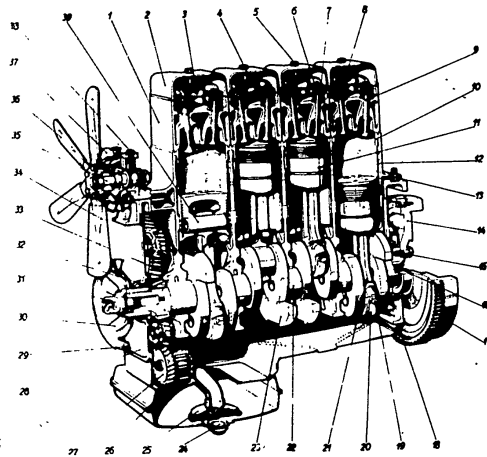
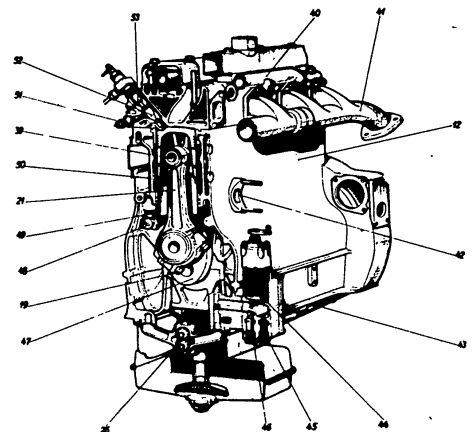


Fig. 6. Longitudinal section of the engine

1. Cylinder head
2. Cylinder head cover
3. Rocker shaft
4. Valve spring
5. Cover bolt
6. Valve rocker
7. Split tapered collars
8. Inlet valve
9. Exhaust valve
10. Cylinder liner
11. Piston
12. Crankcase
13. Oil pressure gauge pipe union
14. Flywheel
15. Flywheel bolt
16. Clutch pilot bearing
17. Starter gear ring
18. Sump gasket
19. Connecting Rod bolt
20. Connecting rod cap
21. Connecting rod
22. Crankshaft journal
23. Counterweight on crankshaft
24. Oil drain plug
25. Oil suction strainer
26. Oil pump gear
27. Oil pump driving gear
28. Oil pump intermediate gear
29. Fan belt
30. Fan belt pulley
31. Crankshaft starting dog
32. Timing gear
33. Timing gear on camshaft
34. Fan bracket
35. Fan shaft
36. Fan blade
37. Fan pulley
38. Fan belt tightening screw
39. Gudgeon pin
40. Water inlet hole
41. Exhaust collector
42. Water inlet hole
43. Sump
44. Edge-type filter element
45. Oil overflow valve
46. By-pass valve
47. Crankshaft
48. Camshaft
49. Valve tappet
50. Push rod
51. Heater plug
52. Precombustion chamber
53. Nozzle holder with nozzle

Fig.7. Cross section of the engine
See text in Fig.6.



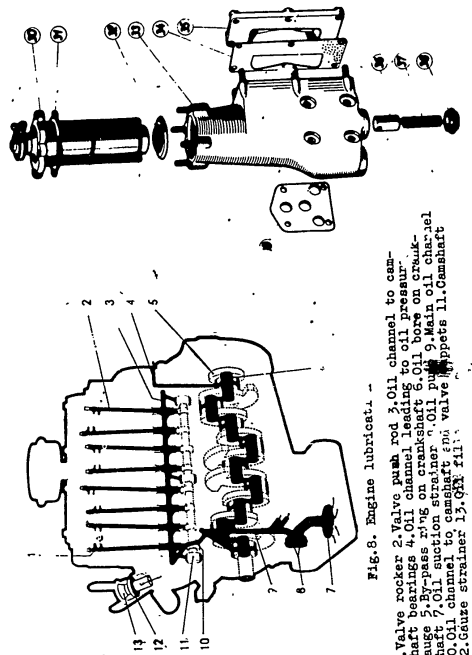


Fig. 8. Engine lubricat. -

- 1. Valve rocker
- 2. Valve push rod
- 3. Oil channel to camshaft bearings
- 4. Oil channel leading to oil pressure gauge
- 5. By-pass ring on crankshaft
- 6. Oil channel to crankshaft
- 7. Oil suction pump
- 8. Oil pump
- 9. Main oil channel
- 10. Oil channel to valve tappets
- 11. Camshaft
- 12. Oil channel to valve tappets
- 13. Oil filter

FIG. 9. Edge-type oil filter

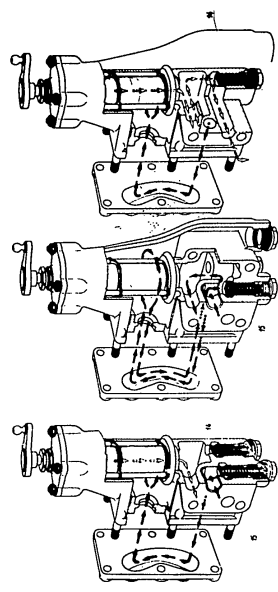


Fig. 10. Working of the valves of the edge-type oil filter
Unfiltered oil
Filtered oil

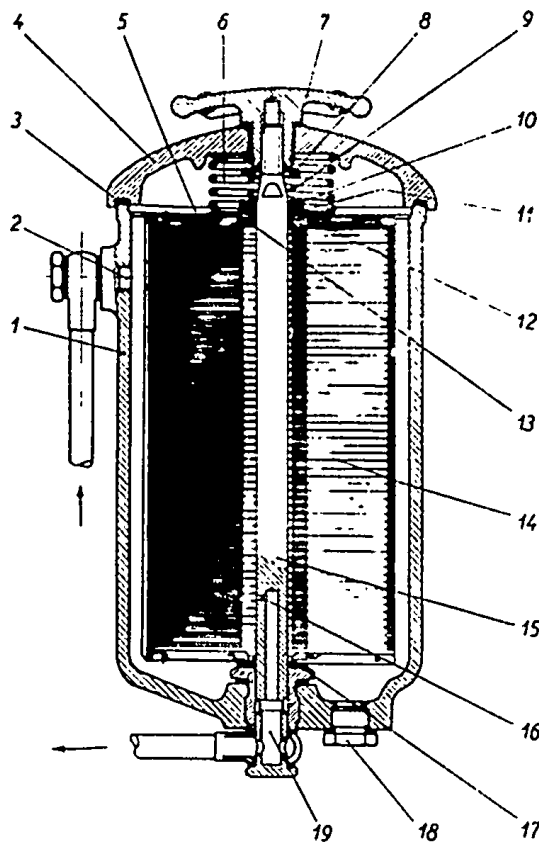


Fig.11. Oil fine filter

- 1. Filter housing
- 2. Inlet port
- 3. Gasket
- 4. Cover
- 5. Spring retainer
- 6. Spring
- 7. Screw handwheel
- 8. Small spring retainer
- 9. Packing gland spring
- 10. Spring bolster
- 11. Felt ring
- 12. Packing gland
- 13. Felt gasket
- 14. Filter element
- 15. Centre screw
- 16. Bore of centre screw
- 17. Felt gasket
- 18. Sediment drain plug
- 19. Outlet port

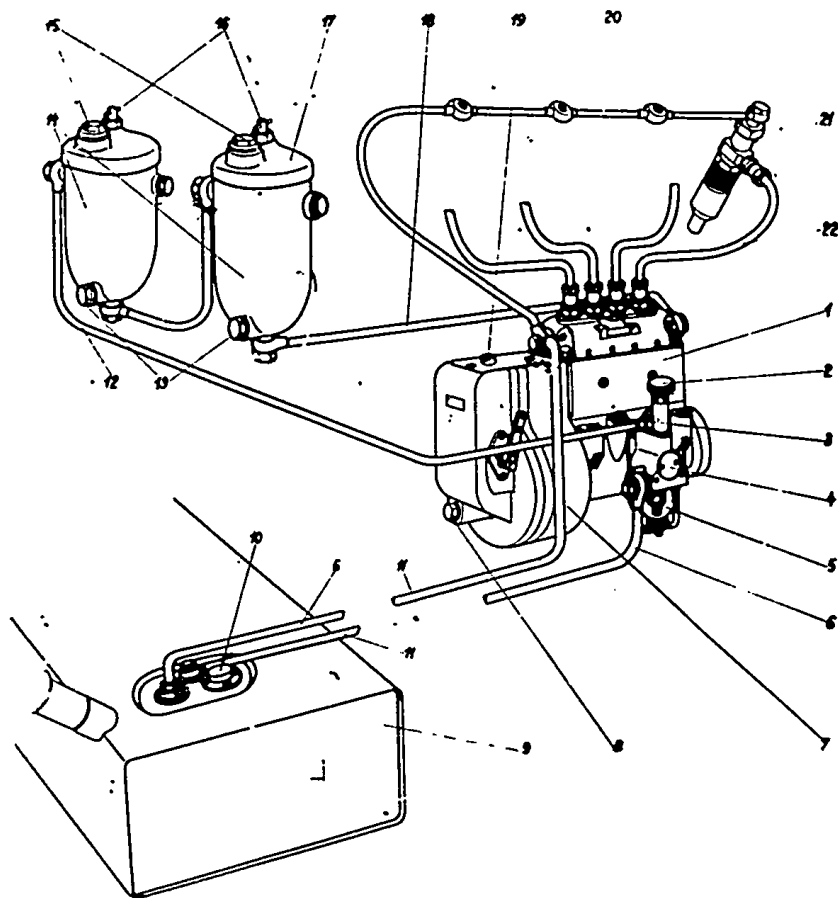


Fig.12. Fuel system

1. Fuel injection pump
2. Hand pump
3. Dipstick
4. Fuel feed pump
5. First filter
6. Fuel suction pipe
7. Governor housing
8. Oil level plug on governor housing
9. Fuel tank
10. Fuel gauge connection
11. Overflow pipe
12. Fuel pipe from feed pump to fine filter
13. Sludge drain plug
14. Fuel fine filter
15. Filler plug on filter
16. Bleeding screw
17. Fine filter cover
18. Fuel pipe
19. Oil filler plug to governor
20. Leak-off pipe
21. Nozzle holder
22. Delivery pressure pipe

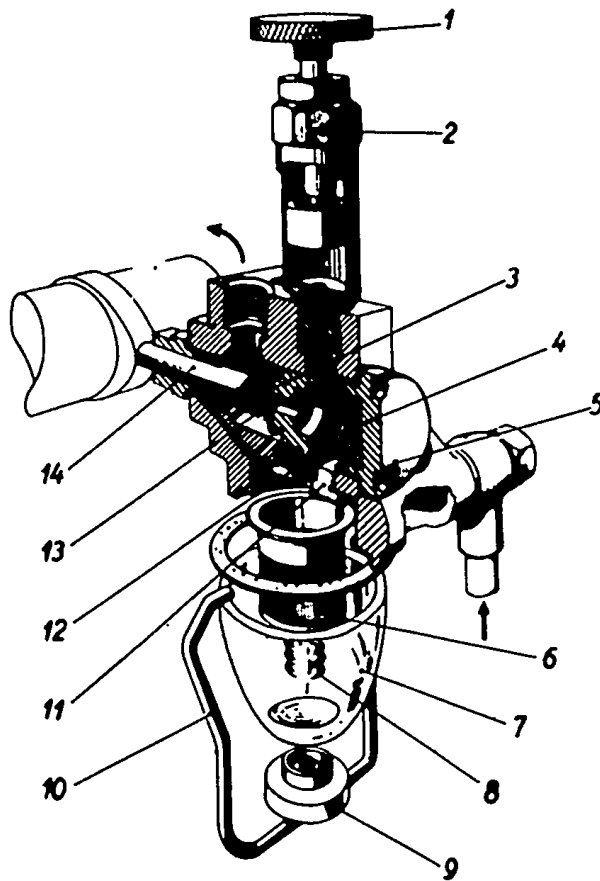


Fig.13. Section through the fuel feed pump

- 1.Hand pump knob
- 2.Hand pump housing
- 3.Plunger
- 4.Plunger spring
- 5.Closing plug
- 6.Filter gauze
- 7.Filter bowl
- 8.Support spring of filter gauze
- 9.Securing nut of filter bowl
- 10.Fixing strap
- 11.Inlet valve housing
- 12.Inlet valve
- 13.Pressure valve
- 14.Push rod

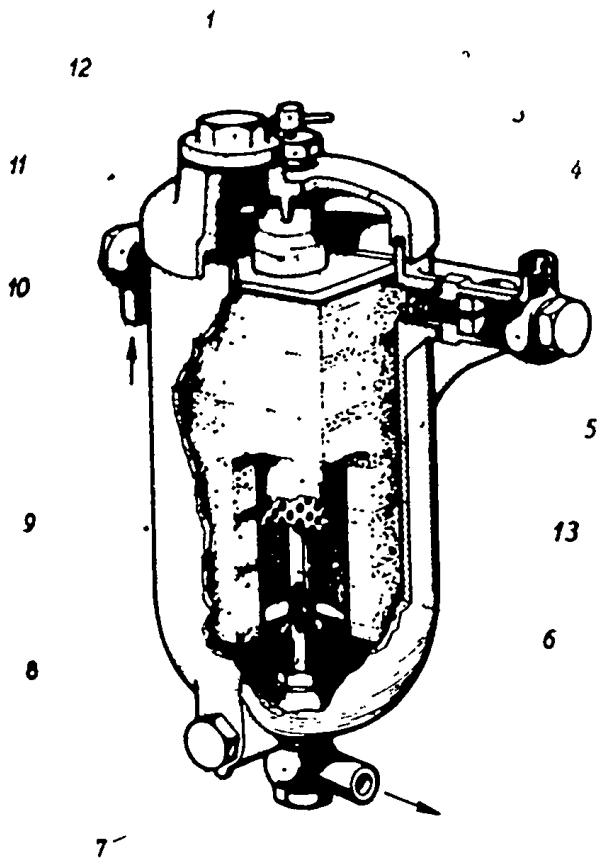


Fig.14. Fuel fine filter

- 1. Bleeding screw
- 2. Cover-securing nut
- 3. Cover to filter housing
- 4. Overflow valve
- 5. Leak-off pipe connection
- 6. Strainer pipe
- 7. Pressure pipe connection towards injection pump
- 8. Sludge drain plug
- 9. Filter element
- 10. Pressure pipe connection from injection pump
- 11. Knurled nut
- 12. Closing plug
- 13. Perforated cylinder covered with gauze

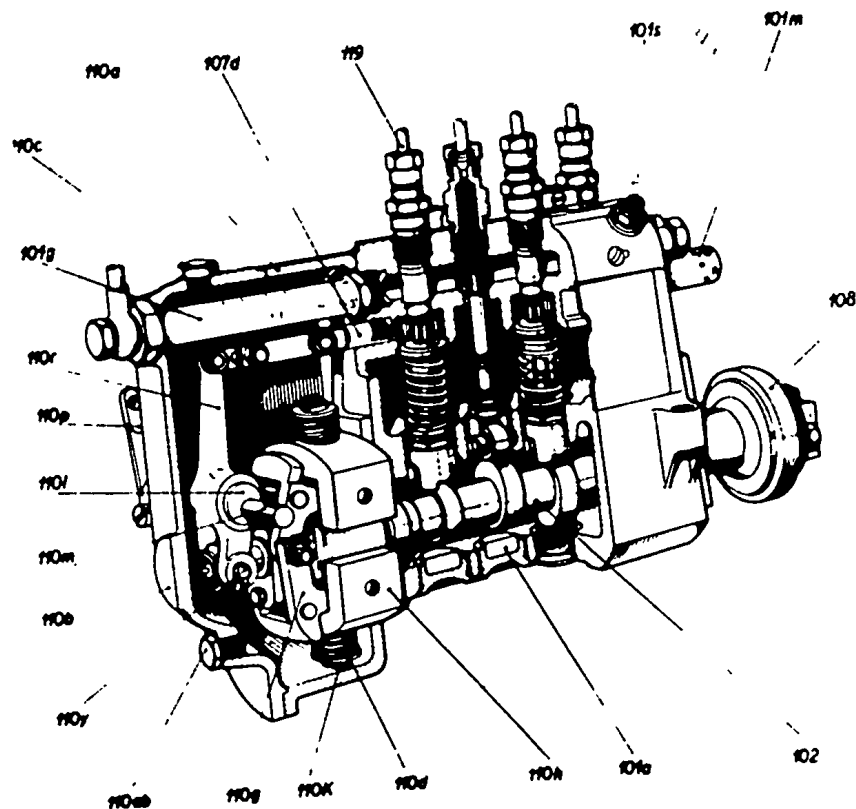


Fig.15. Fuel injection pump with governor

101a. Felt insert 101g. Fuel inlet 101m. Control rod stop
screw 101s. Bleeding screw 102. Camshaft 107d. Control gear
rack 108. Coupling disc 110a. Governor housing 110b. Gover-
nor housing cover 110c. Oil filler orifice 110d. Governor
spring 110ab. Oil level plug 110g. Bell crank lever 110h. Fly-
weight 110k. Adjusting nut 110l. Eccentric 110m. Eccentric
shaft 110p. Control lever 110r. Floating lever 110j. Lever
shaft 119. Pressure pipe to nozzle

Fig. 16. Adjustment of the fuel injection pump

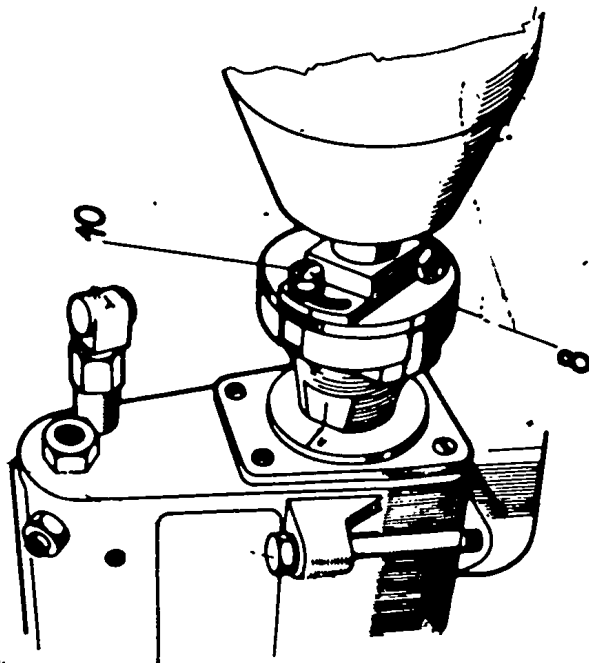
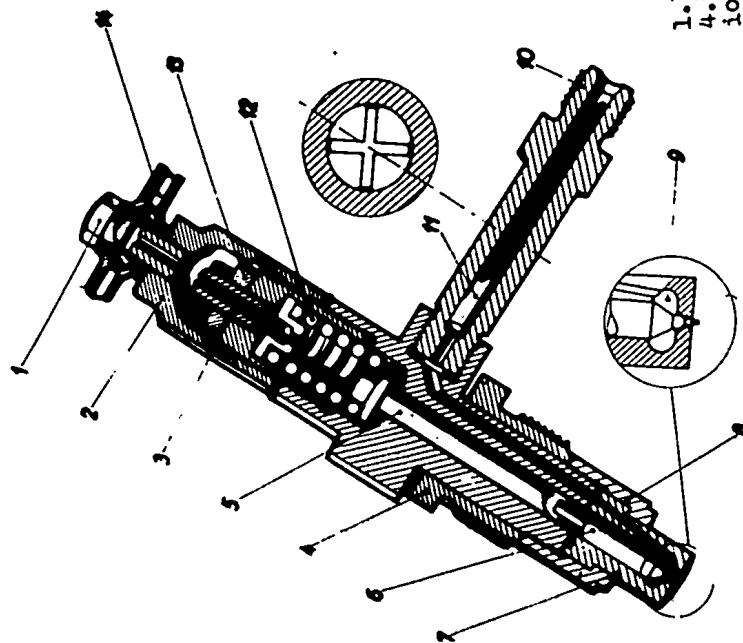


Fig. 17. Nozzle holder

1. Hollow screw
2. Closing cap
3. Adjusting screw to spring
4. Threaded sleeve
5. Spindle
6. Nozzle needle
7. Nozzle
8. Union screw
9. Nozzle chamber
10. Inlet adaptor
11. Filter stick
12. Spring
13. Counternut
14. Leak-off pipe

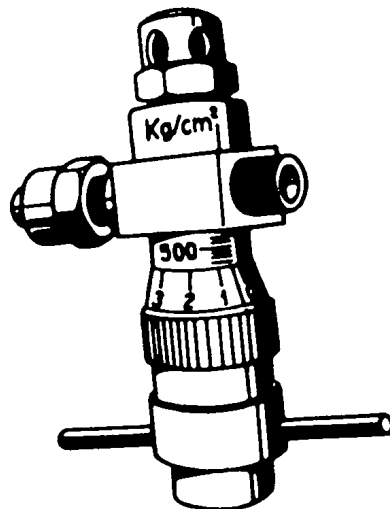


Fig.18. Top-pressure gauge

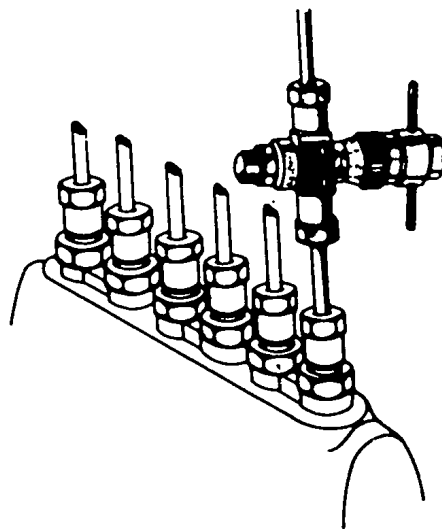
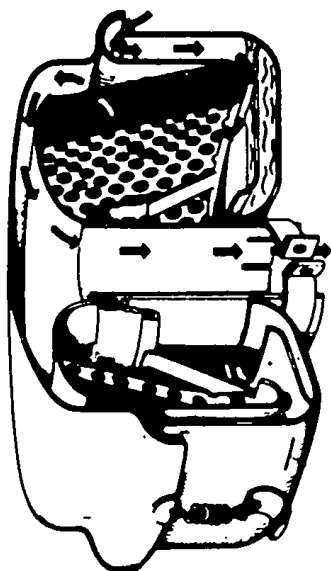
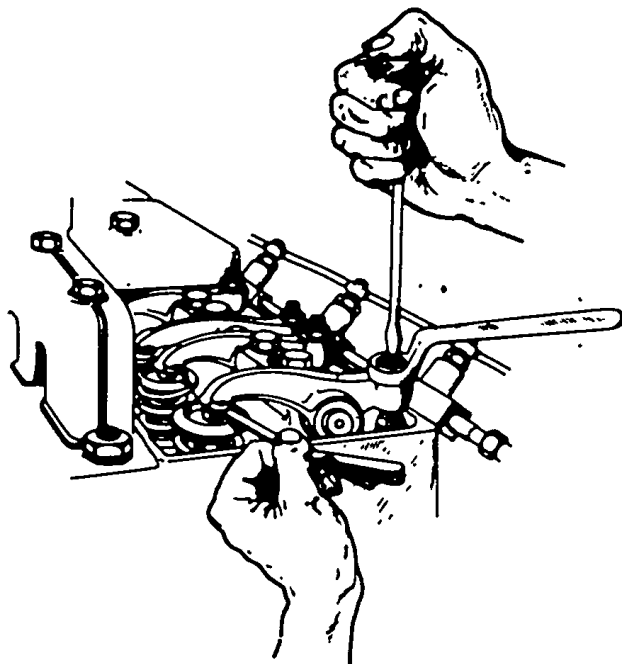


Fig.19. How to mount the top-pressure gauge

Fig.22. Valve clearance adjustment



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Fig.20. Section through the air cleaner

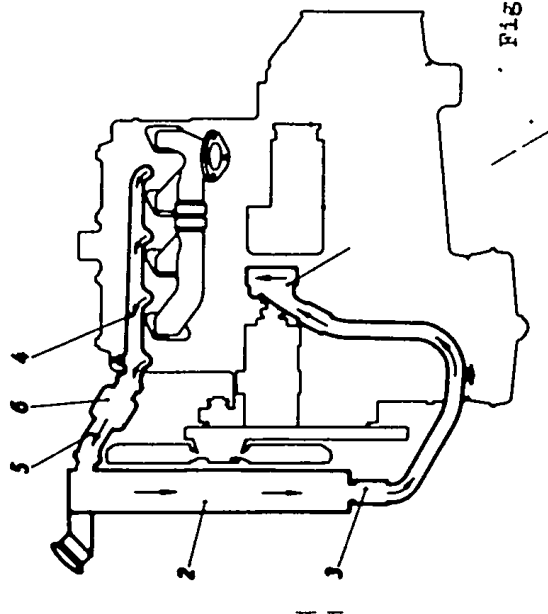


Fig.21. Cooling circulation

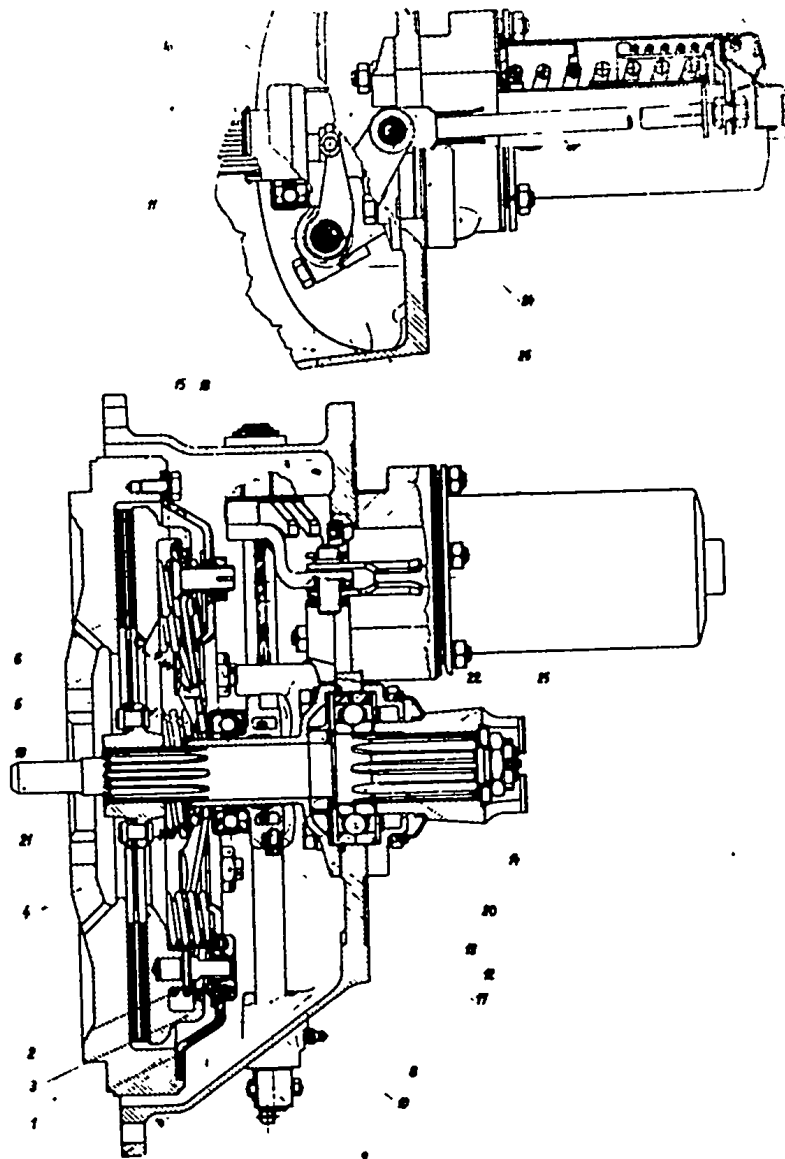
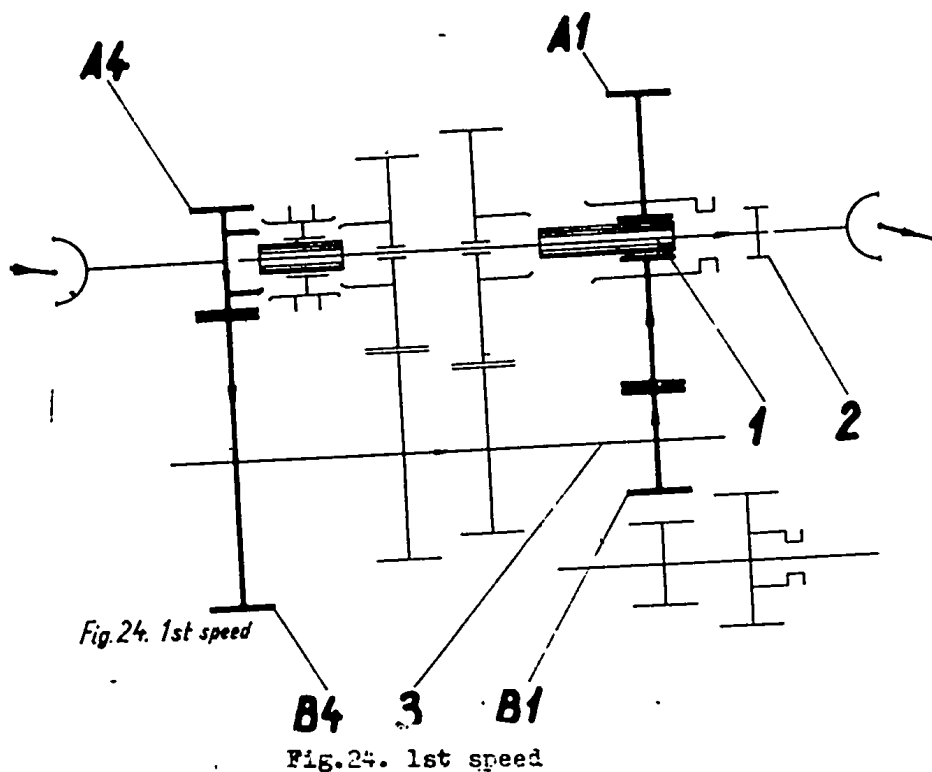


Fig. 23. Clutch

1. Clutch cover
2. Pressure spring
3. Pressure plate
4. Flywheel
5. Tightening spring
6. Friction disc
7. Clutch housing
8. Release shaft
9. Actuating lever to edge-type filter
10. Ball grease nipple
11. Release bush
12. Release fork
13. Bearing cover
14. Rubber sleeve seal ring
15. Release lever
16. Oiler
17. Release bearing
18. Adjusting shackle screw
19. Adjusting nut
20. Ball bearing
21. Clutch shaft
22. Rubber sleeve seal ring
23. Clutch hub
24. Clutch lever
25. Clutch actuating cylinder



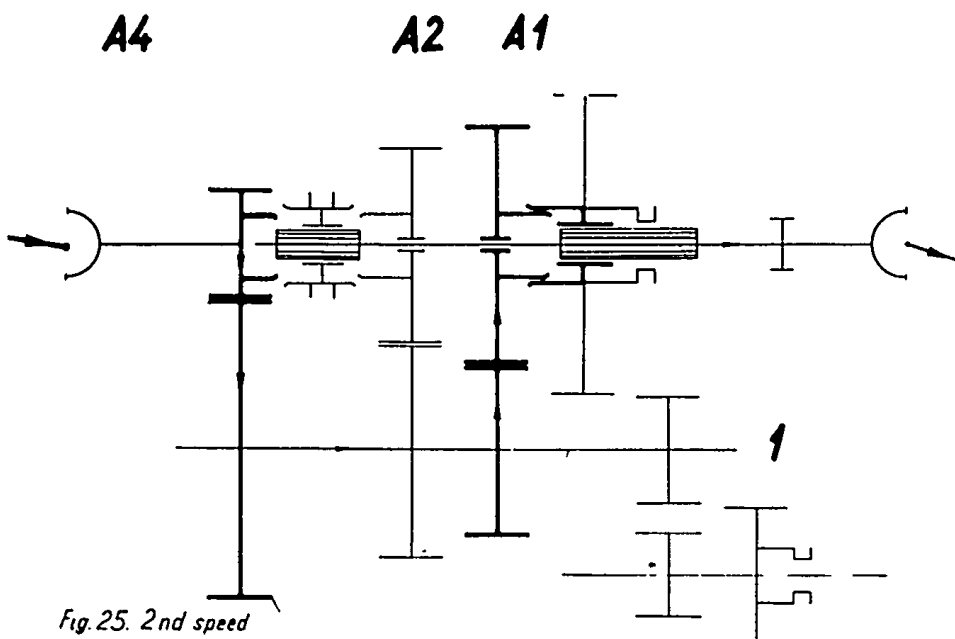
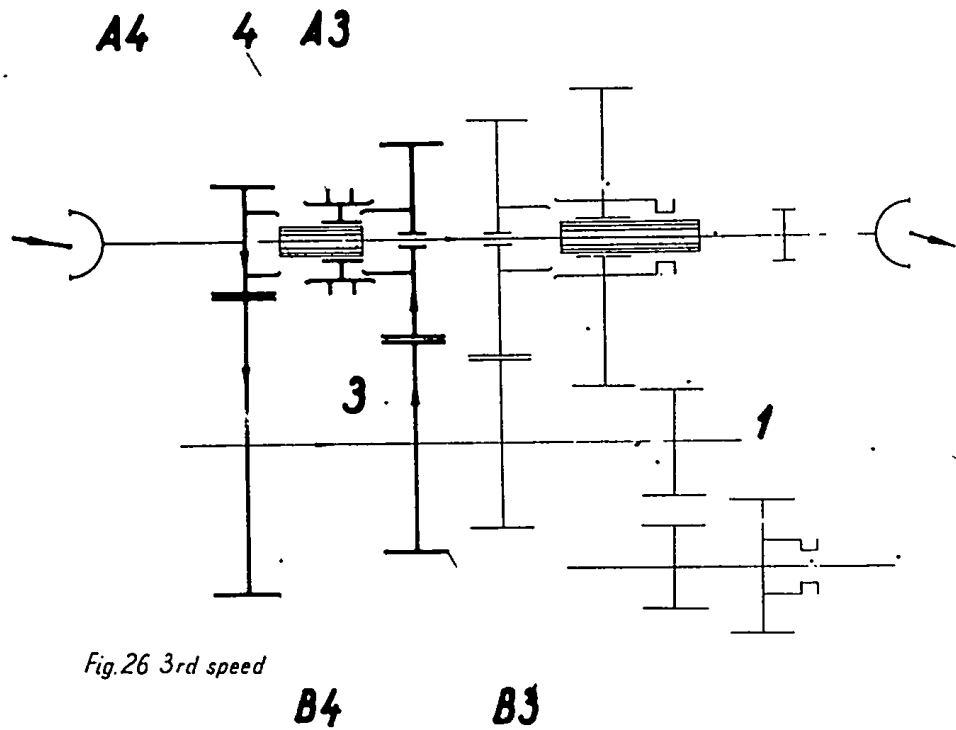
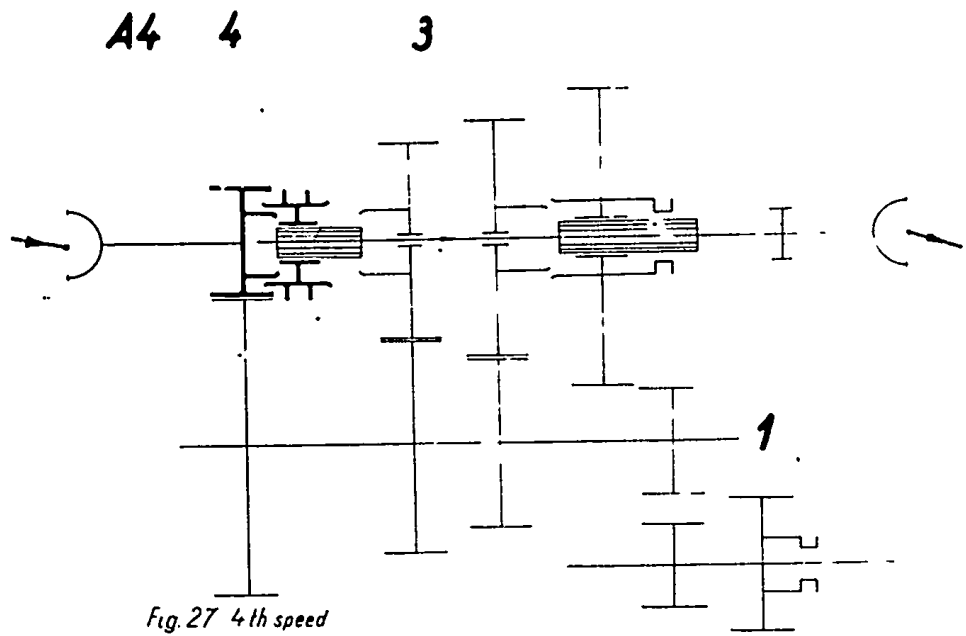


Fig. 25. 2nd speed

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Fig. 25. 2nd speed



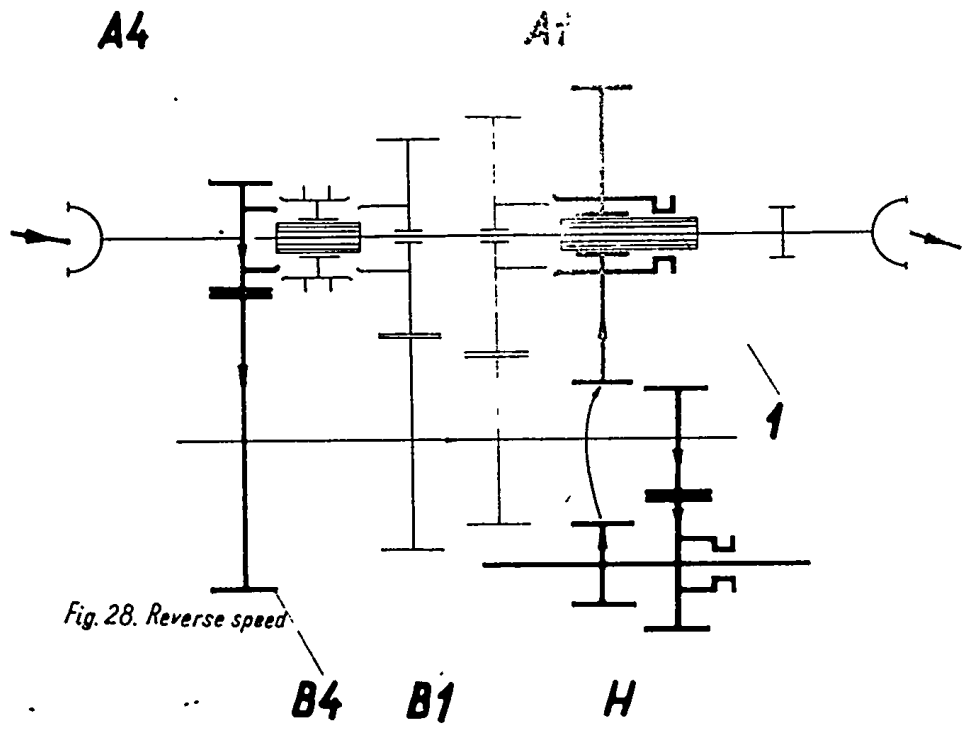
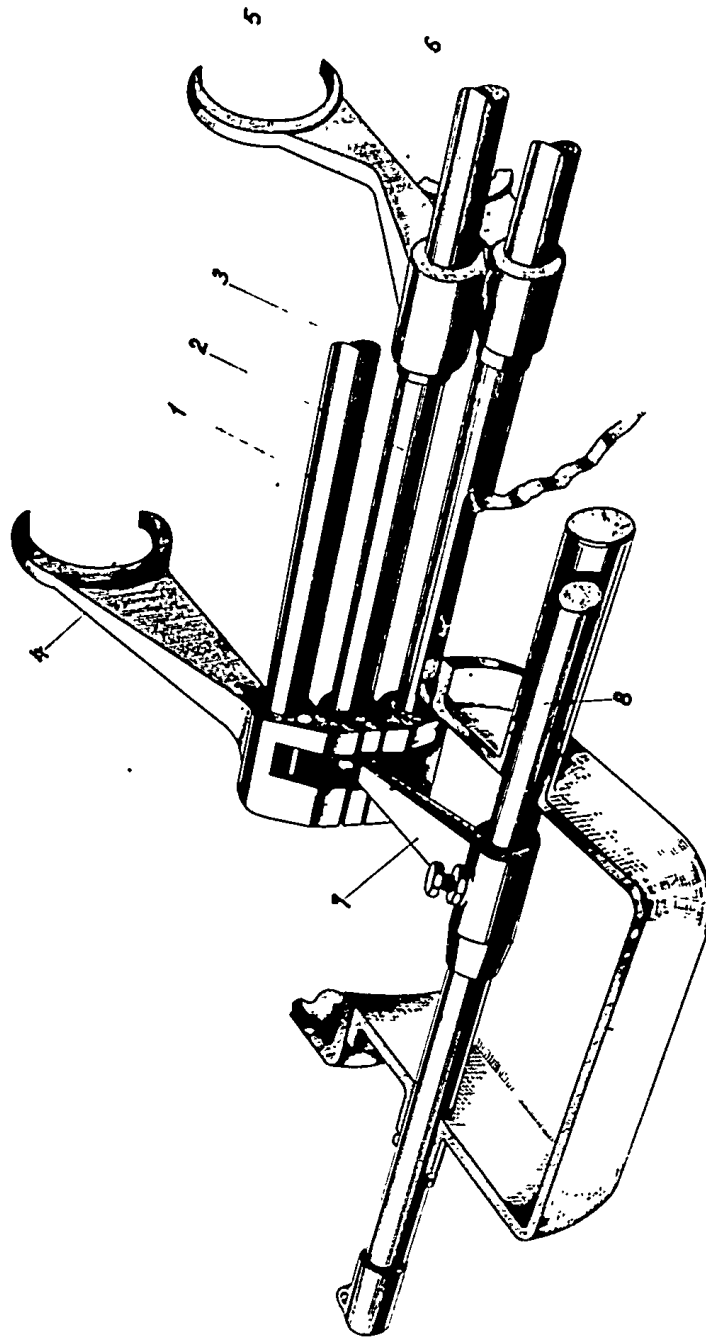


Fig. 28. Reverse speed

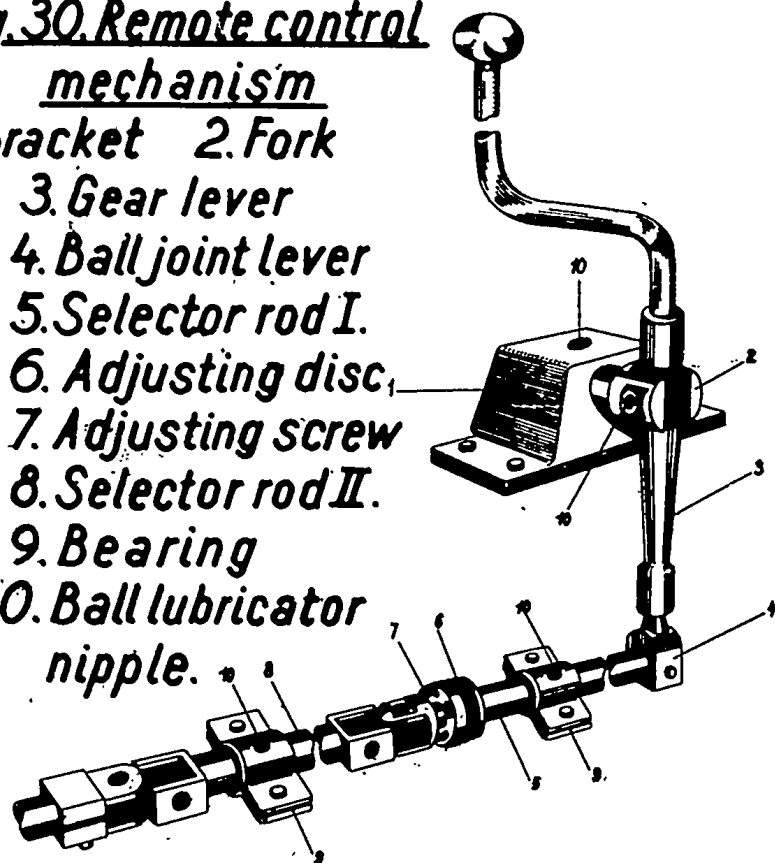
Fig. 28. Reverse speed

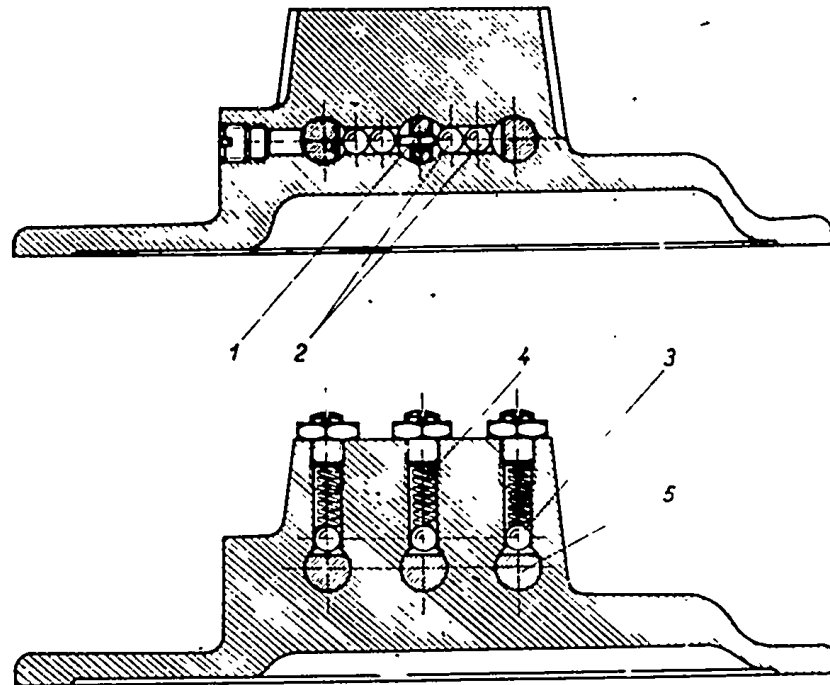
Fig.29. Selector rods and forks
1.2.3. selector rods 4.5.6. selector forks 7.selector
lever 8.selector shaft



**Fig. 30. Remote control
mechanism**

- 1. Bracket
- 2. Fork
- 3. Gear lever
- 4. Ball joint lever
- 5. Selector rod I.
- 6. Adjusting disc
- 7. Adjusting screw
- 8. Selector rod II.
- 9. Bearing
- 10. Ball lubricator
nipple.





Remote control mechanism

Fig.31. Blocking

1.Blocking pin 2.Upper blocking balls 3.Lower blocking balls 4.Blocking springs 5.Selector rods

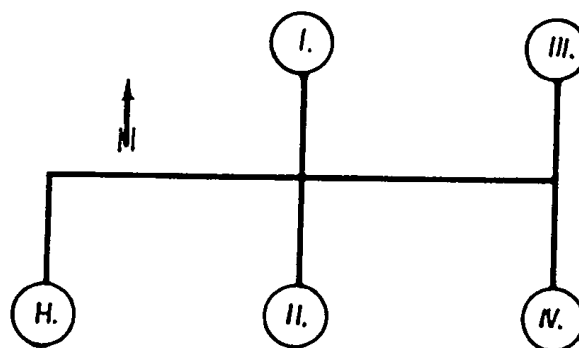


Fig.32. Diagram of gear lever positions

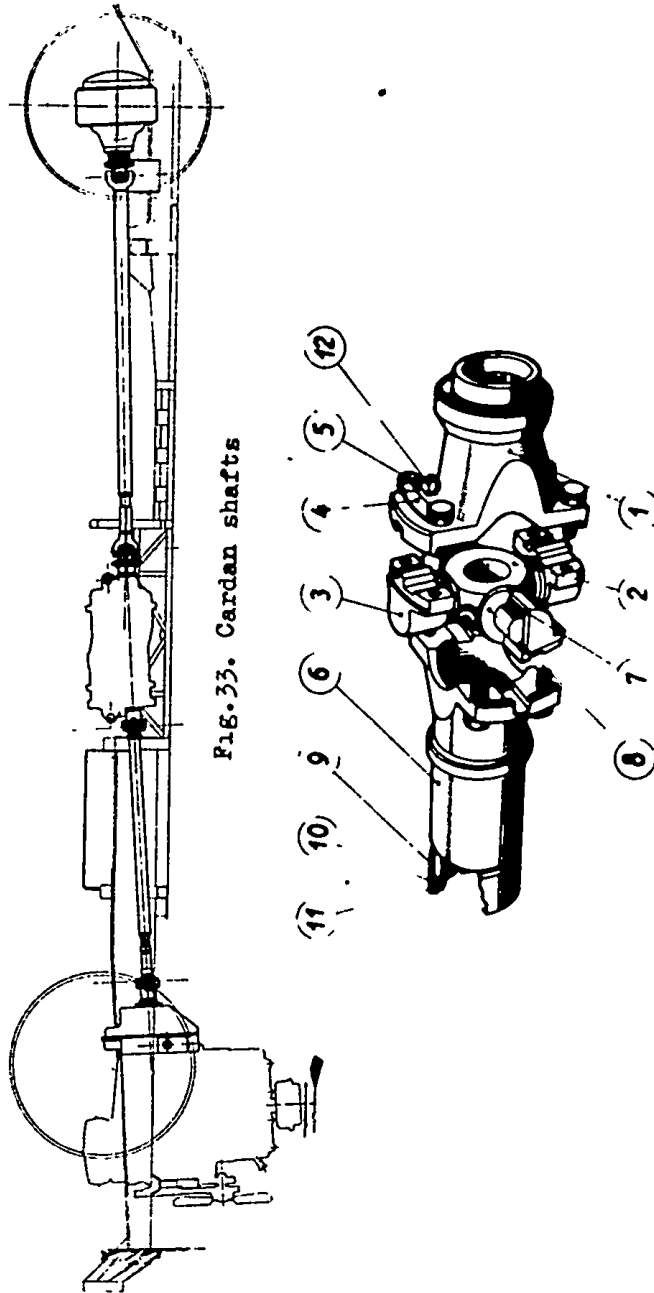


Fig. 33. Cardan shafts

Fig. 34. Front universal joint

1. Flanged hub
2. Cross joint
3. Needle roller body
4. Locking plate
5. Hexagon screw
6. Flanged hub with splined sleeve
7. Needle roller
8. Cork seal with metal cap
9. Thread cap
10. Felt gasket
11. Supporting plate
12. Grease nipple

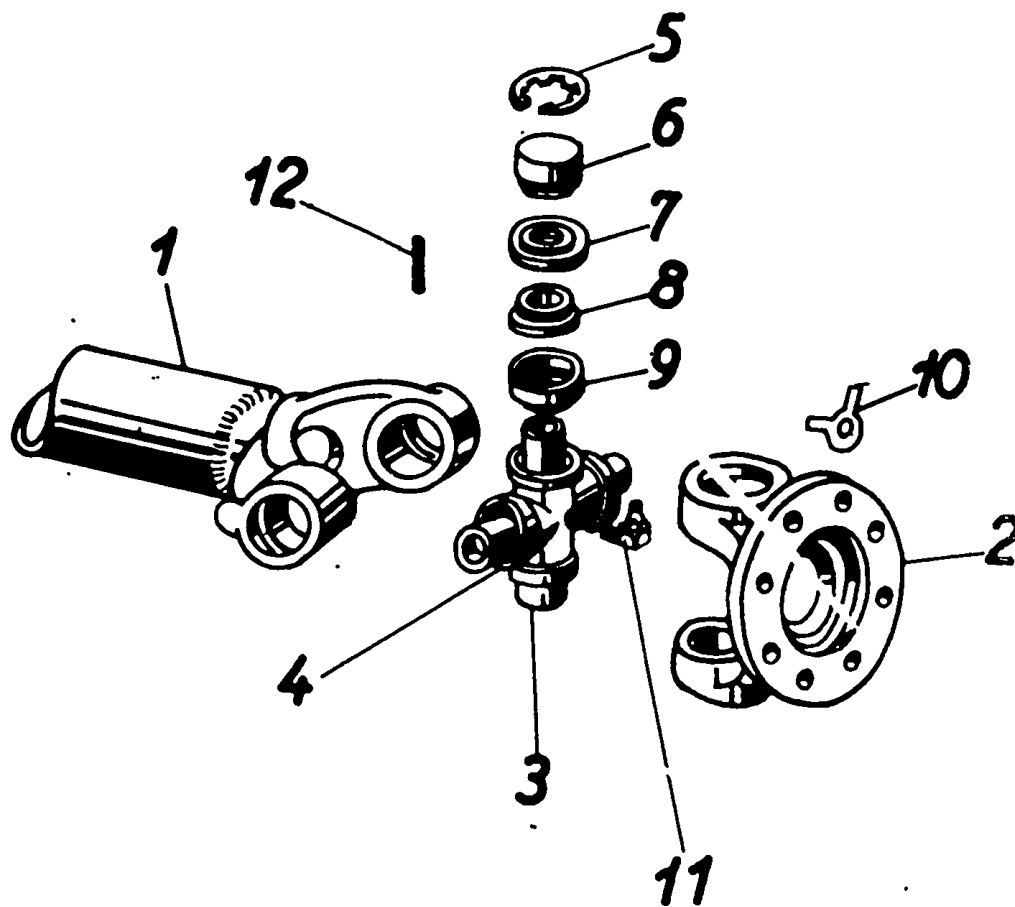


Fig.35. Rear universal joint

1. Propeller shaft 2.Cardan flange 3.Cross joint 4.Protecting ring 5.Fixing ring 6.Bearing shell 7.Bracket 8.Seal 9.Cap 10.Locking plate 11.Ball grease nipple 12.Needle roller

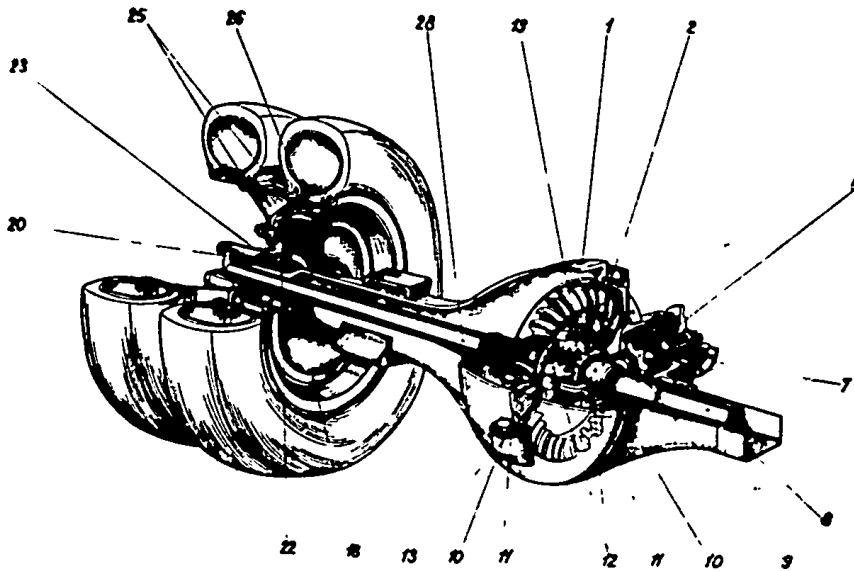


Fig.36. Section through rear axle and differential gear

- 1.Rear axle 2.Crown wheel 3.Driving pinion 5.Driving pinion
 7.Tapered roller bearing 8.Rear axle shaft 9.Cylindrical roller
 bearing 10.Differential side pinion 11.Tapered roller bearing
 12.Differential planet pinions 13.Axle shafts 18.Brake support
 20.and 22. Tapered roller bearings 23.Wheel hub 25.Disc wheel
 26.Brake drum 28.Axle shaft

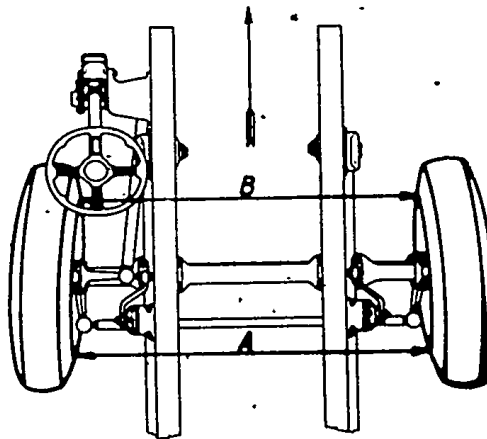


Fig.37. Toe-in

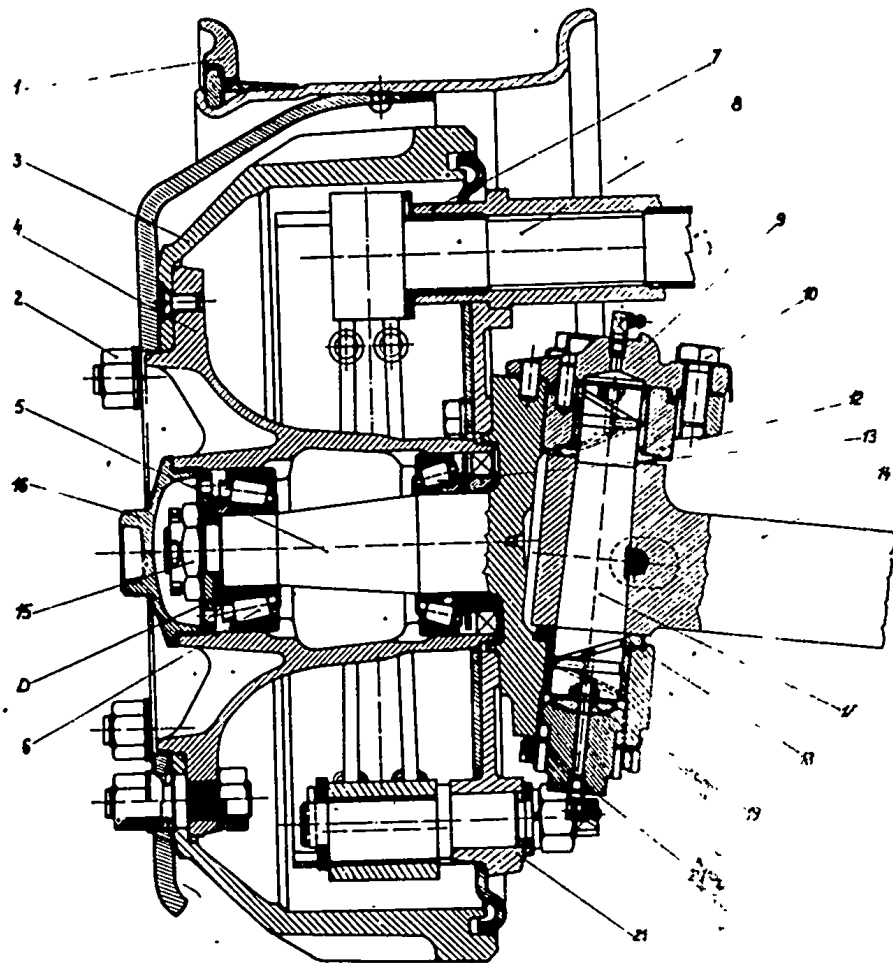


Fig. 38. Front axle sectional view

1. Wheel rim
2. Nut
3. Brake drum
4. Wheel hub
5. Stub axle
6. Outer tapered roller bearing
7. Sleeve
8. Brake cam
9. Steering arm
10. Hexagon nut
11. Upper axle joint bush
12. Inner tapered roller bearing
13. Front axle
14. Low castellated nut
15. Closing cap
16. Axle pin
17. Lower bush
18. Thrust pad
19. Adjusting screw
20. Brake support
21. D adjusting disc

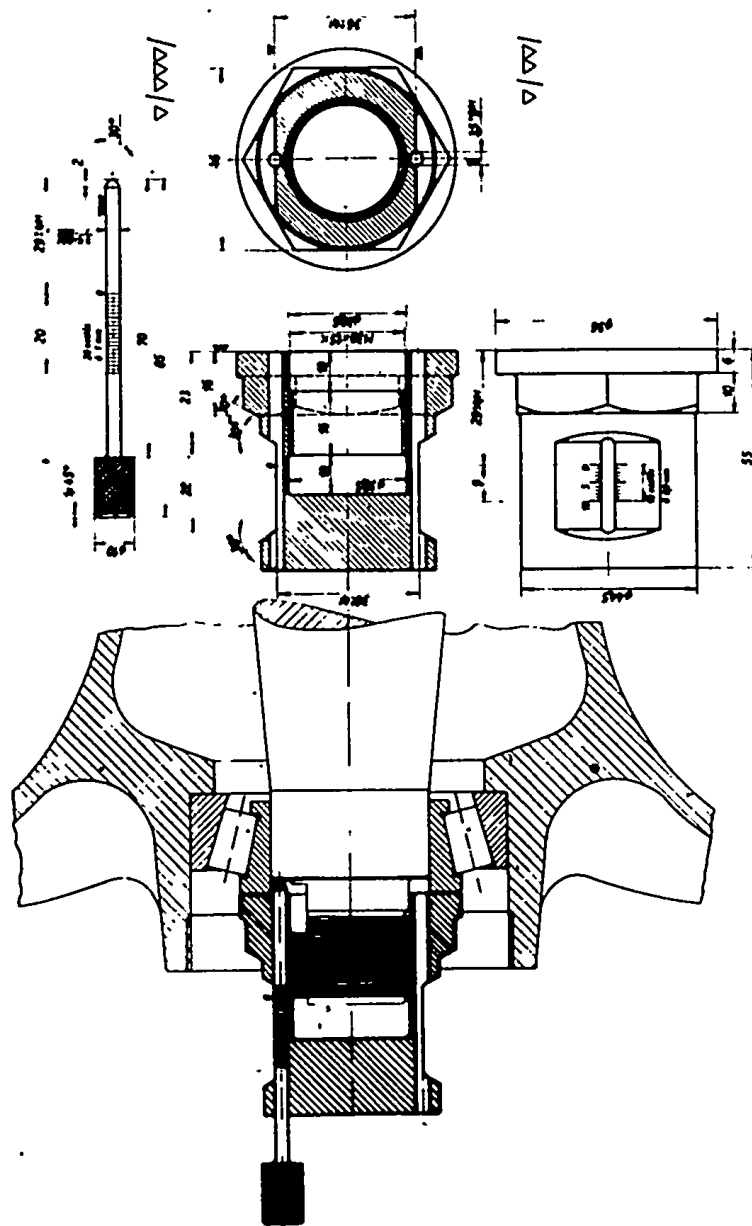


Fig. 39. Gauge for measuring shim thickness

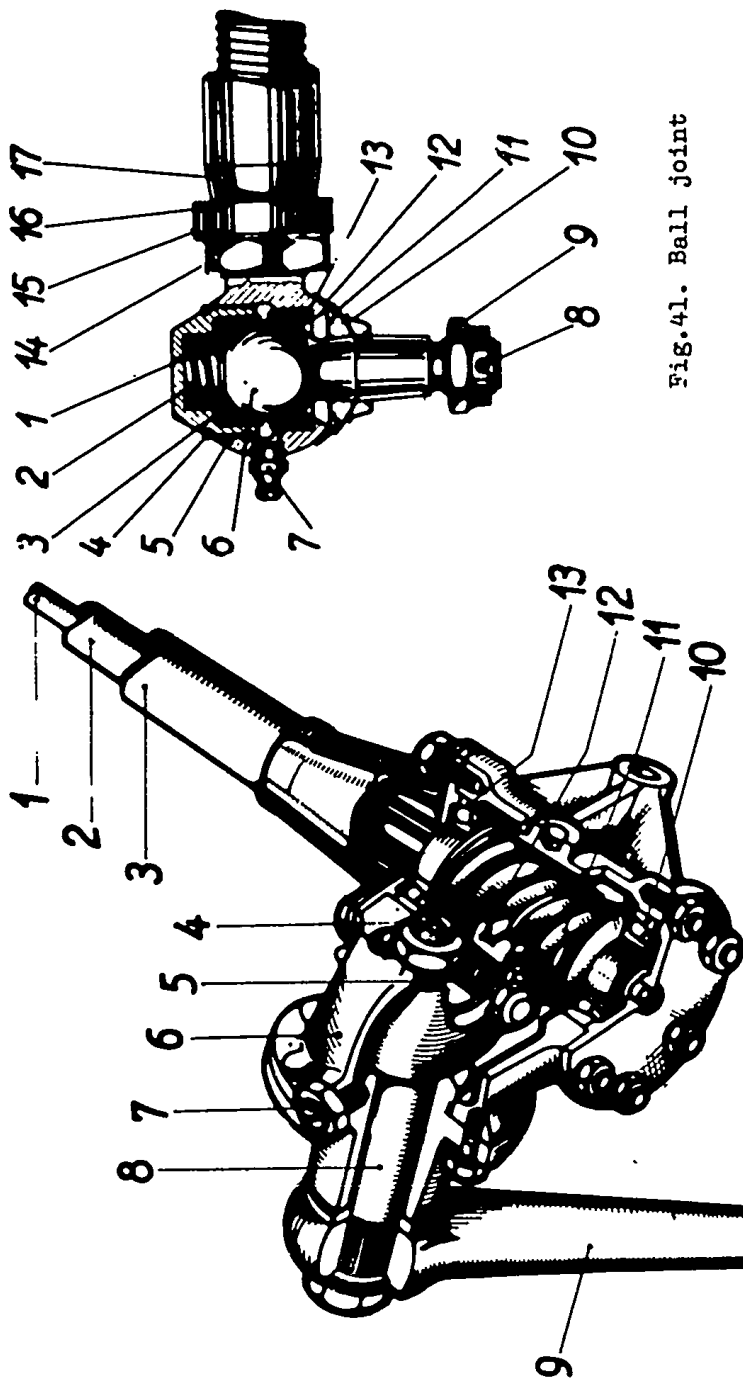
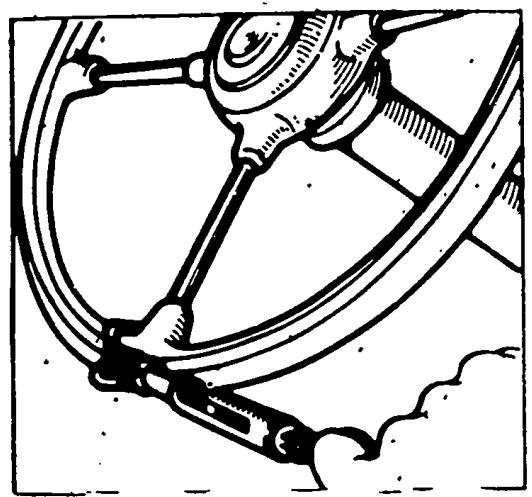
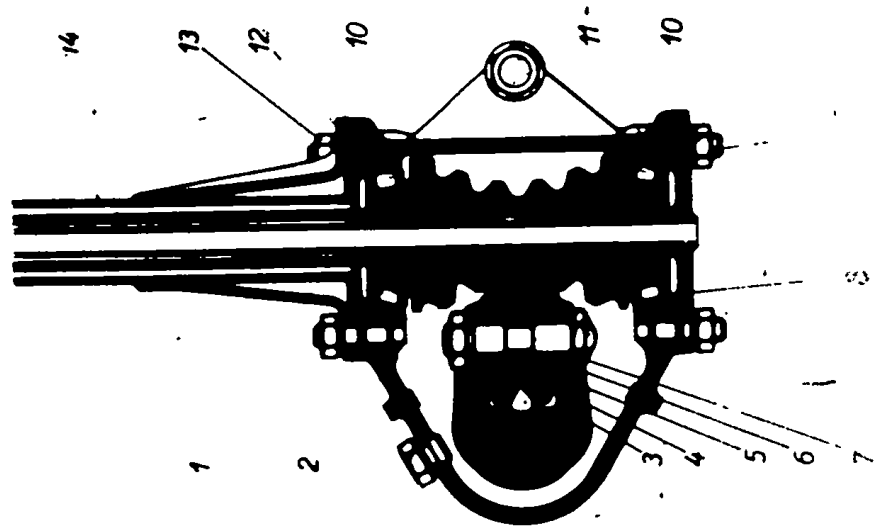


Fig.41. Ball joint

Fig.40. Steering gear

1. Horn wire duct 2. Steering gear jacket tube 3. Steering column 4. Adjusting screw 5. Restoring roller 6. Steering box 7. Adjusting screw 8. Worm shaft 9. Steering arm 10. Tapered roller bearing 11. Steering worm 12. Double roller 13. Tapered roller bearing

Fig. 42. Section through the steering gear .
1. Steering gear jacket tube 2. Steering worm 3. Worm shaft
4. Double roller 5. Supporting disc 6. Bush 7. Restoring roller
8. Bottom cover 9. Nuts of bottom cover 10. Shim 11. Tapered
roller bearing 12. Steering column 13. Nut 14. Worm wire duct



... to kir. ... adjustment

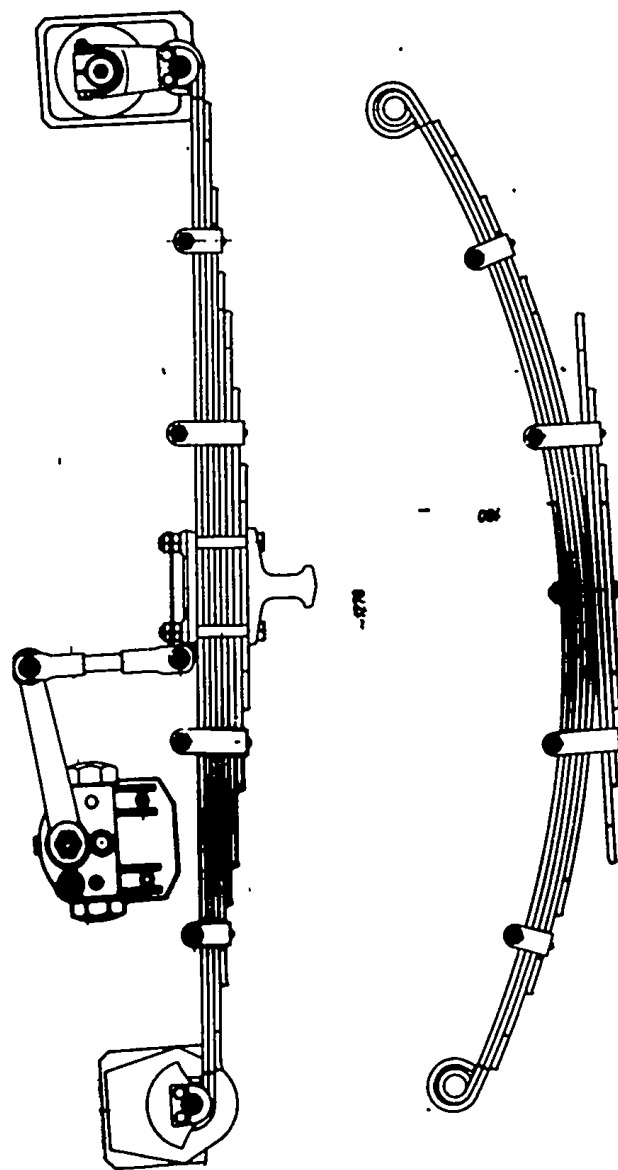


Fig.44. Front spring mounted and dismounted

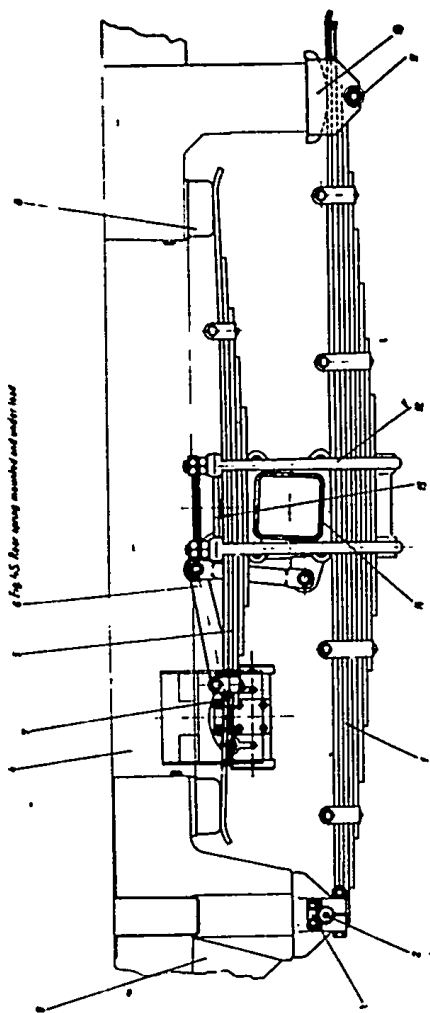


FIG. 45. Rear spring mounted and under load

1. Rear main spring
2. Spring pin
3. Front bracket
4. Beam
5. Auxiliary spring
6. Shock absorber lever
7. Shock absorber
8. Auxiliary spring rubber stop
9. Frame spring bracket
10. Sliding shoe
11. Bolt
12. Spring shackle
13. Clamp plate
14. Rear axle

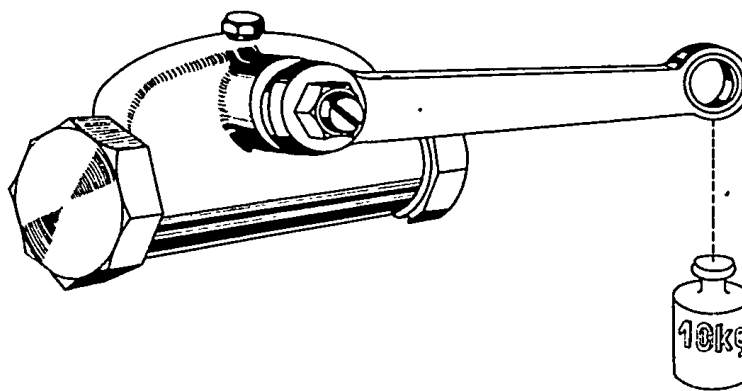


Fig. 47. Adjustment of the shock absorber

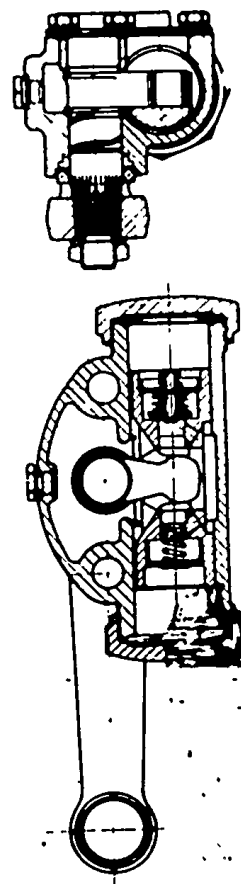


Fig. 46. Piston-type shock absorber

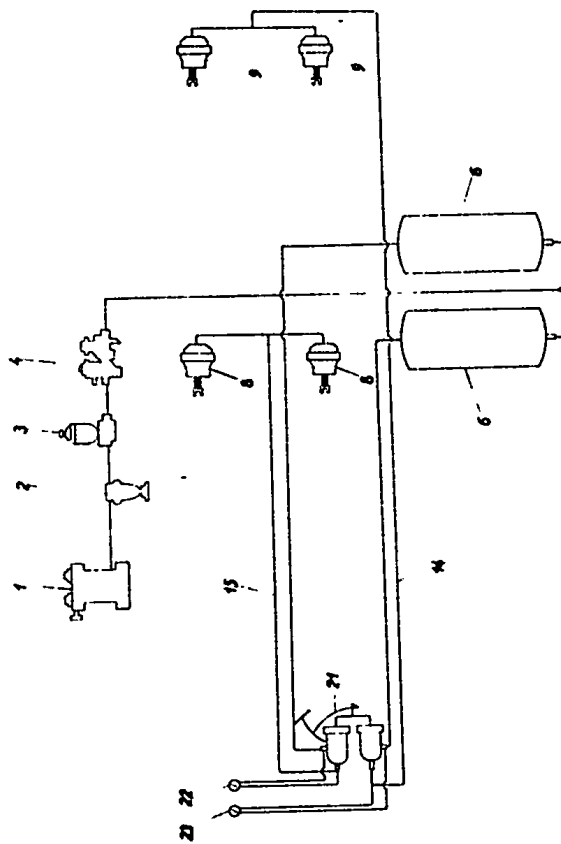


FIG. 48. Diagram of the brake system

- 1. Air compressor
- 2. Tyre filling bottle
- 3. Anti-freeze pump
- 4. Air brake Governor valve
- 5. Air reservoirs
- 6. Front wheel brake cylinders
- 7. Rear wheel brake cylinders
- 8. Air pressure gauges
- 9. Pedal valve
- 10-13. Pipes
- 14-15. Air pressure gauges
- 16-19. Air reservoirs
- 20. Air compressor
- 21. Pedal valve
- 22-23. Air pressure gauges

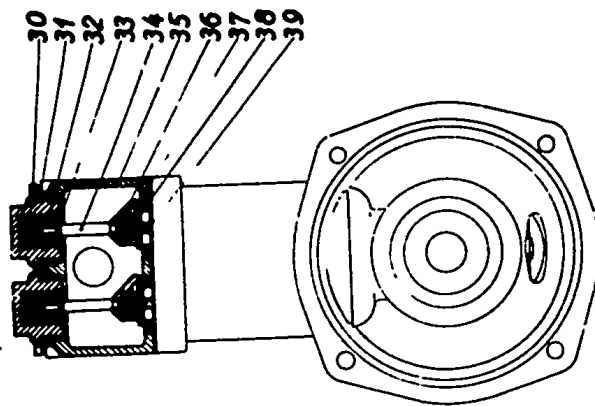
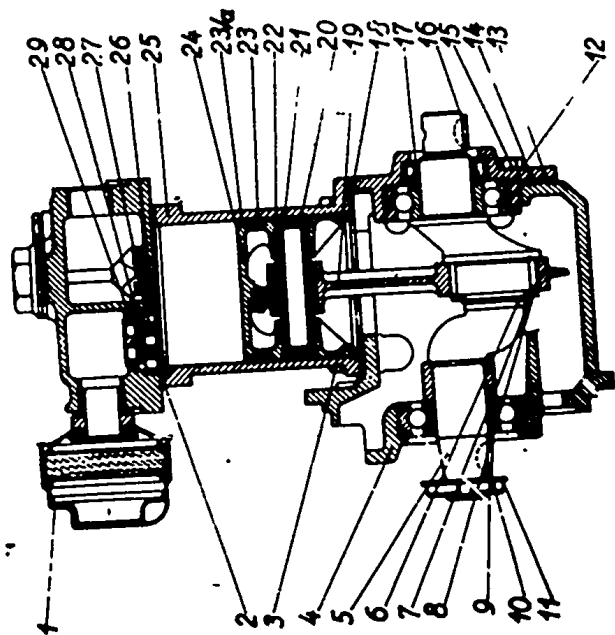


Fig. 49. Air compressor

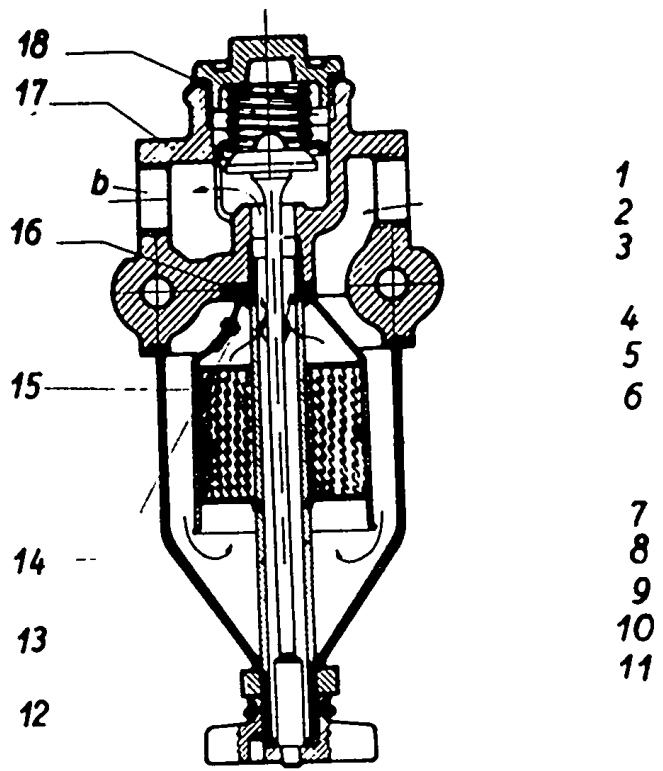


Fig.50. Tyre filling bottle

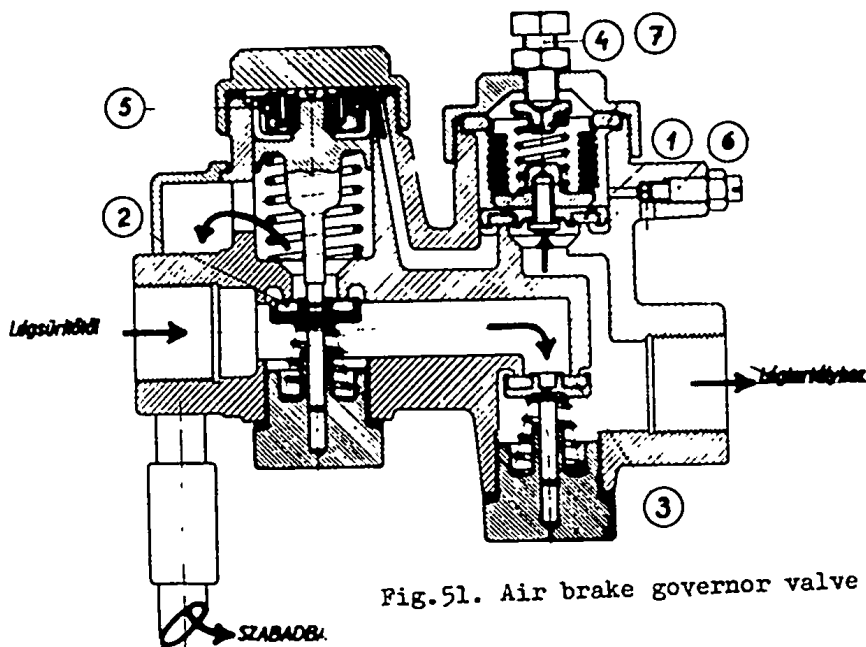


Fig. 51. Air brake governor valve

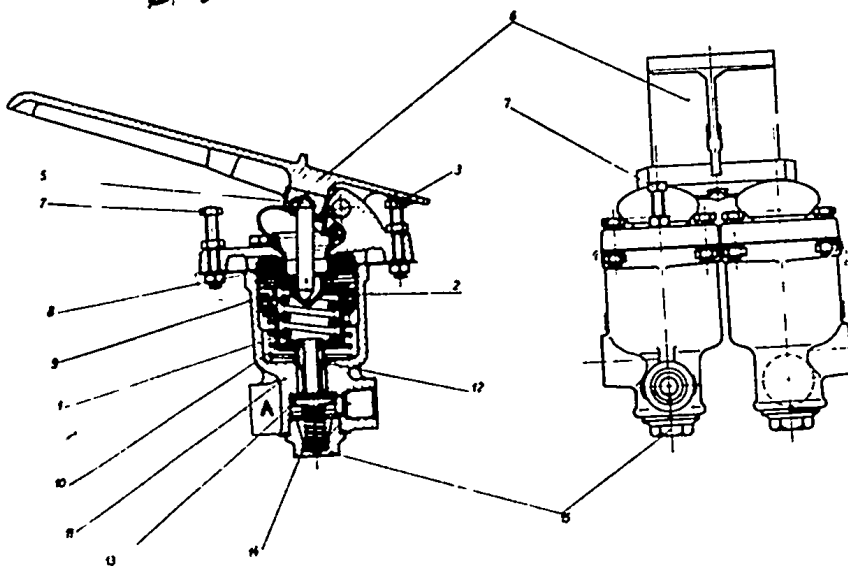


Fig. 52. Pedal valve

- 1. Spring 2. Spring cup 3. Thrust pin to rear stop screw
- 6. Pedal 7. Front stop screw 8. Filter element 9. Plunger
- 10. Plunger spring 11. Cylinder 12. Tubular extension
- 13. Valve 14. Valve spring 15. Screw plug

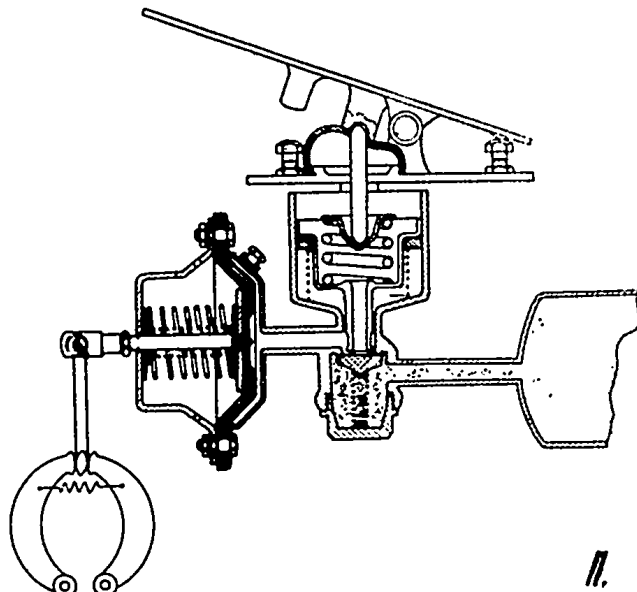


Fig 53. pedal valve in acting position

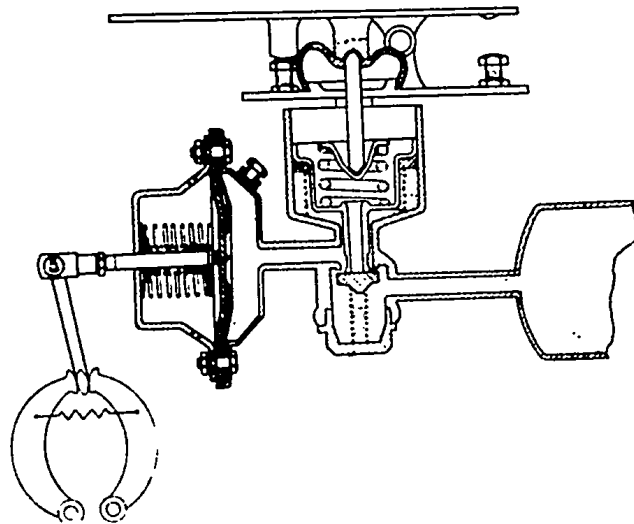


Fig 54 pedal valve at full braking

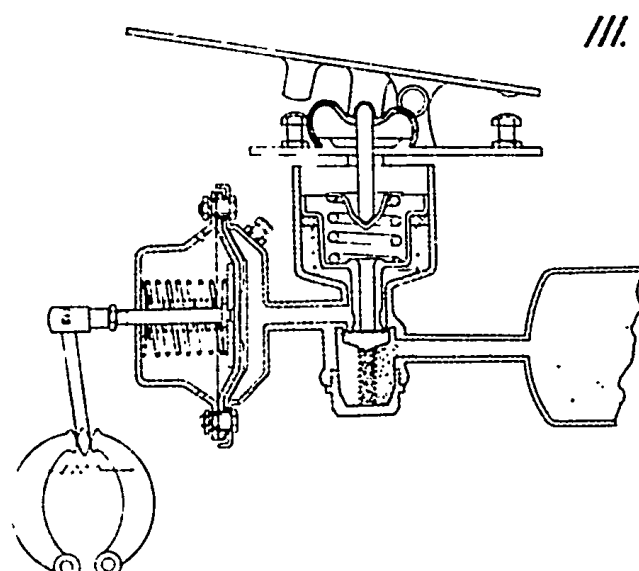


Fig. 55 pedal valve at partial braking

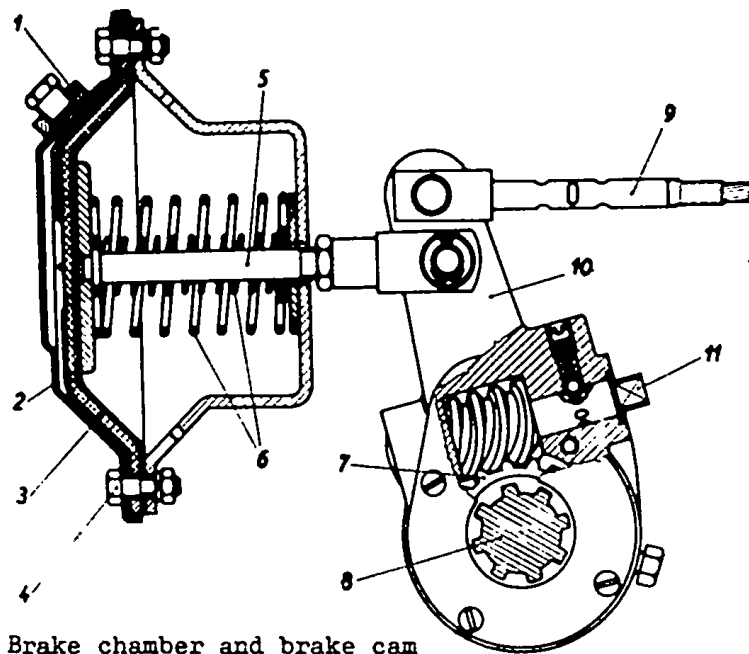


Fig. 56. Brake chamber and brake cam

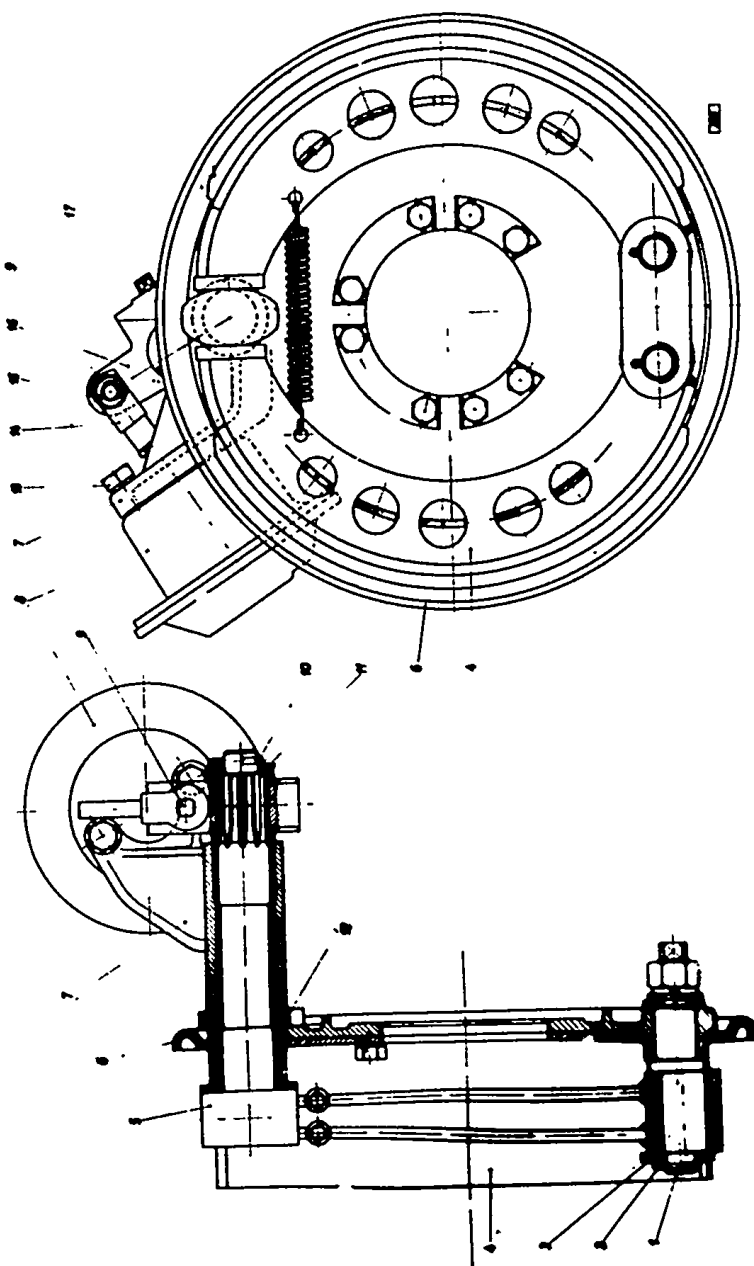


Fig. 57. Front wheel brake

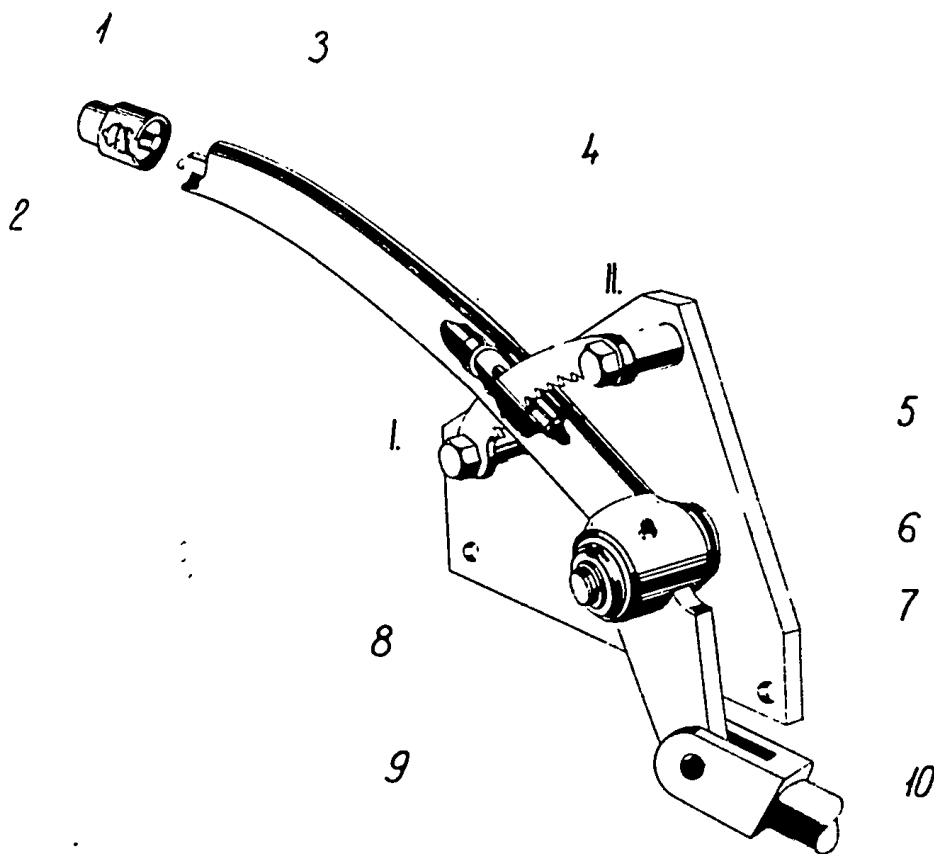


Fig. 58. Hand brake lever

1. Press-button 2. Spring 3. Hand brake lever 4. Toothed
segment 5. Ratchet 6. Grease nipple 7. Hand brake lever
bracket 8. Shaft 9. Hand brake extension 10. Push rod

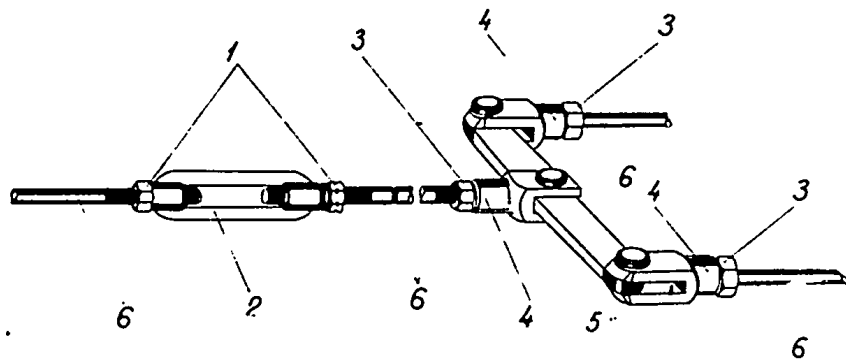


Fig. 59. Adjustment of the hand brake

- 1. Counternuts
- 2. Tightening nut
- 3. Lock nuts
- 4. Fork ends
- 5. Rocker
- 6. Push rods

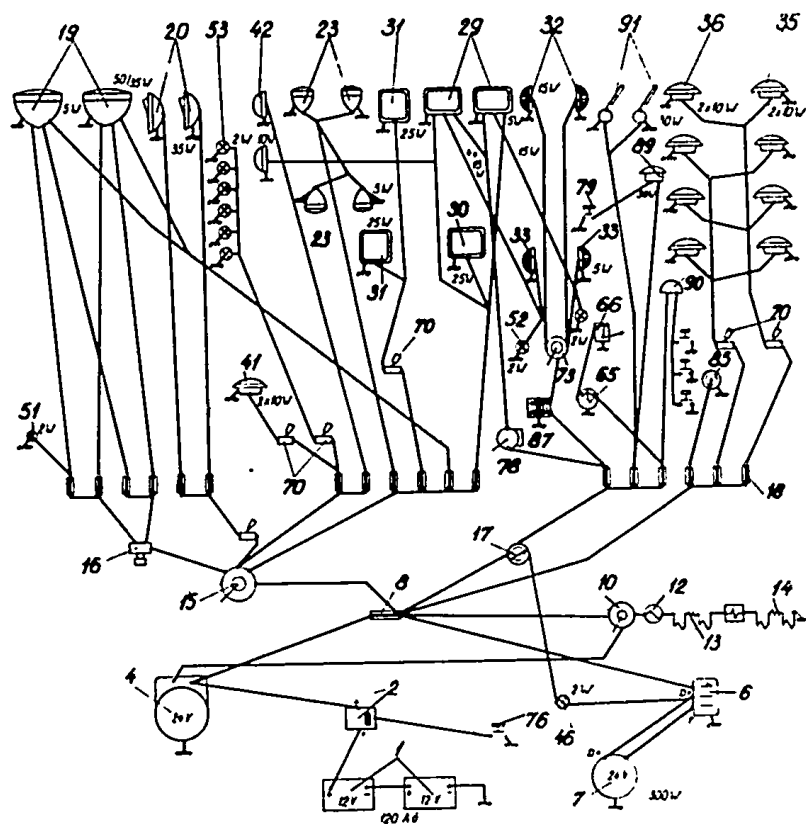


Fig.60. Connection diagram of the electrical equipments

1. Battery
2. Battery main switch, magnetic
4. Starter motor
6. Voltage regulator
7. Dynamo
8. Connection bridge
10. Heater starter switch
12. Heater control
13. Heater plug
14. Heater plug adapter
15. Central lighting switch
16. Dimmer pedal
17. Key current switch
18. Fuse box
19. Head lamp
20. Fog lamp
23. Position light
29. Tail lamp
30. Registration mark light
31. Route light
32. Front flashlight direction indicator
33. Side flashing light
35. Right-hand roof lamps
36. Left-hand roof lamps
41. Driver's cab light
42. Staircase light
46. Dynamo warning lamp
51. Head lamp warning lamp
52. Flashlight warning lamp
53. Instrument panel light
65. Fuel gauge
66. Fuel gauge operator
70. Swing switch
73. Indicator switch
76. Press-button switch
78. Stop lamp switch
79. Horn press-knob
85. Plug-socket holder
87. Flashlight switch
89. Signal horn
90. Signal bell
91. Windscreen wiper

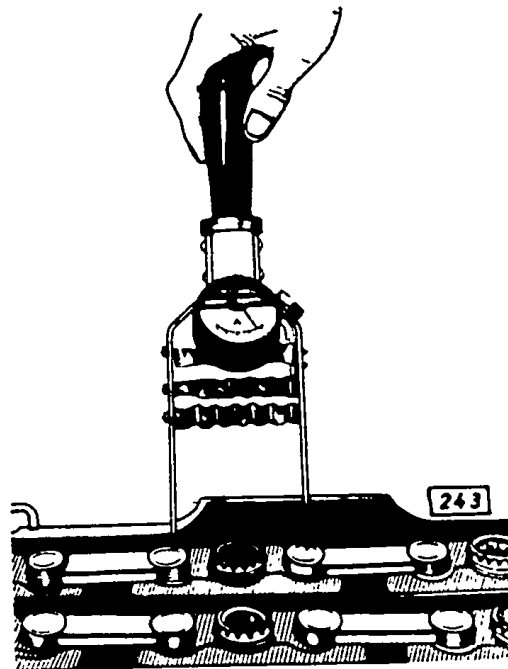
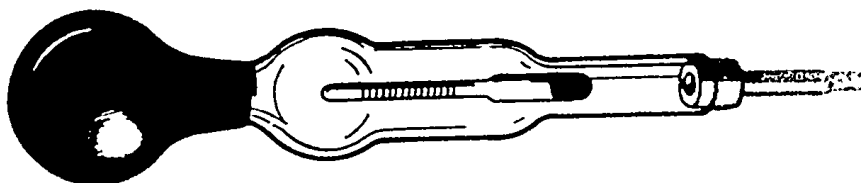


Fig.61. Applying the cell-testing Voltmeter

Fig.62. Hydrometer



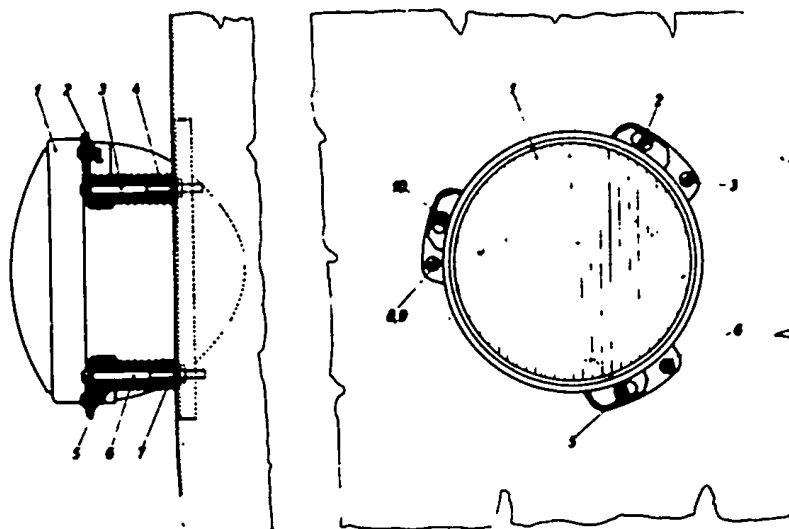


Fig.63. Mounting the head lamps

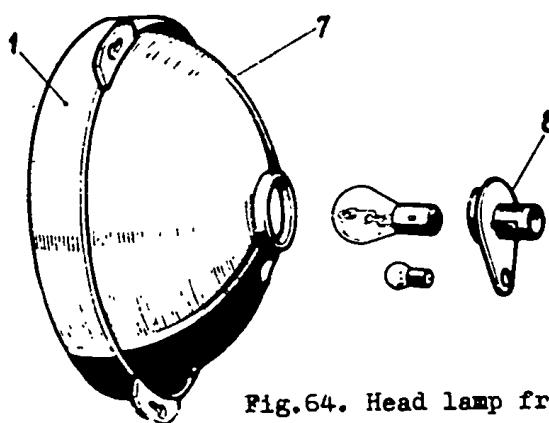


Fig.64. Head lamp frame with mirror

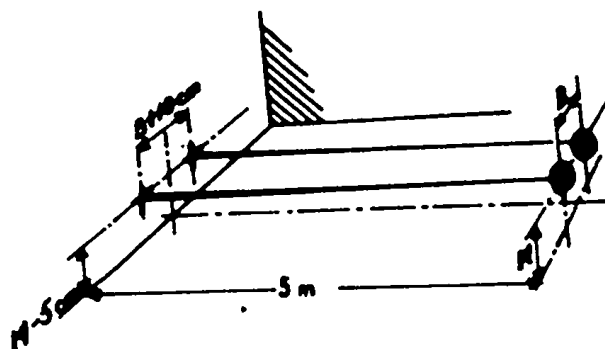


Fig.65. Aligning the road beam

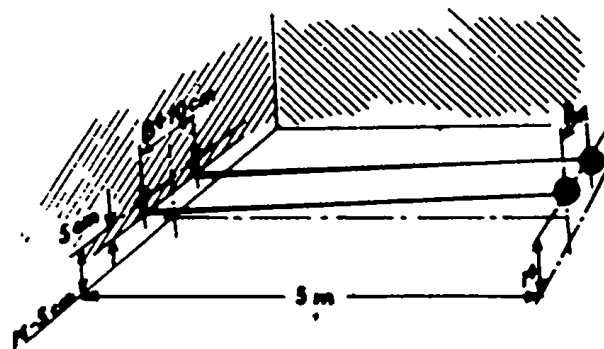


Fig.66. Aligning the dipped beam

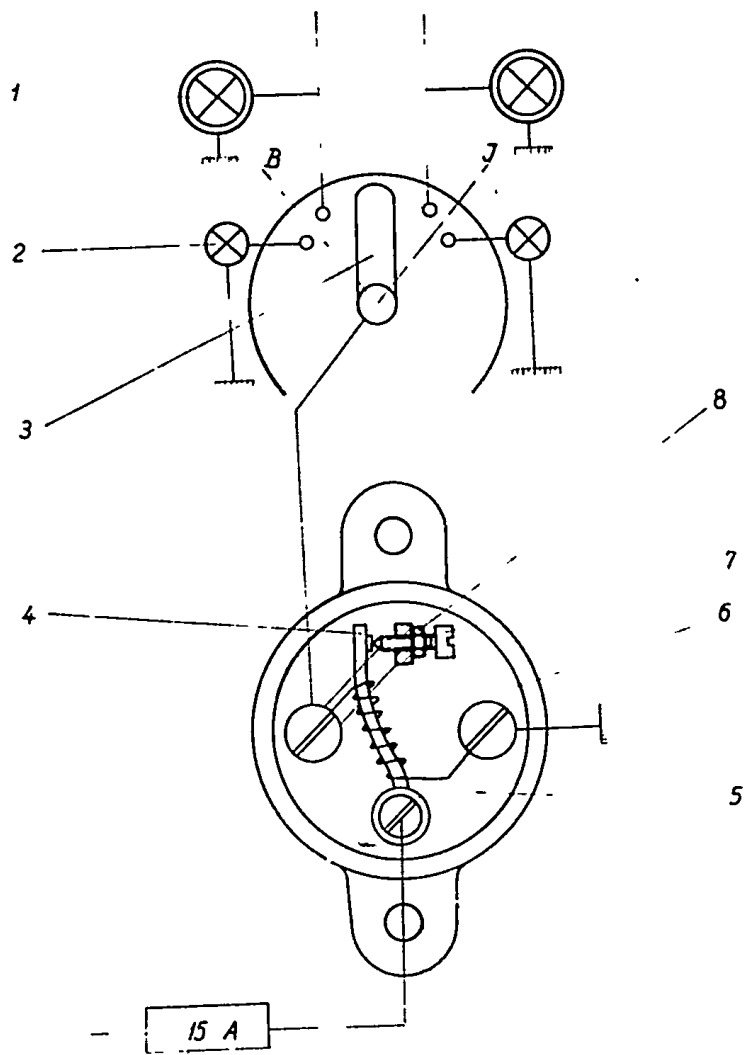


Fig.67. Flashlight direction indicator

1. Indicator lamp
2. Warning lamp
3. Indicator switch
4. Bimetallic leaf spring
5. Interrupter
6. Heater filament
7. Contact screw
8. Counternut

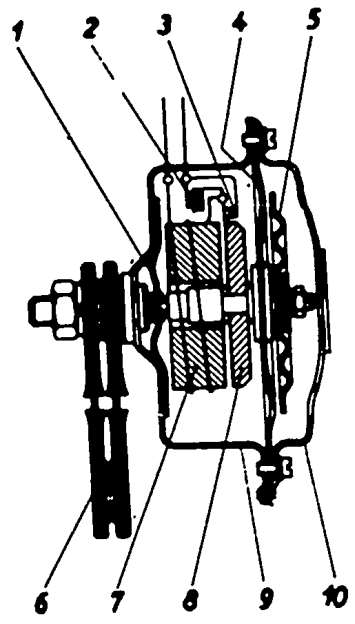


Fig.68. Diagram of the electric horn

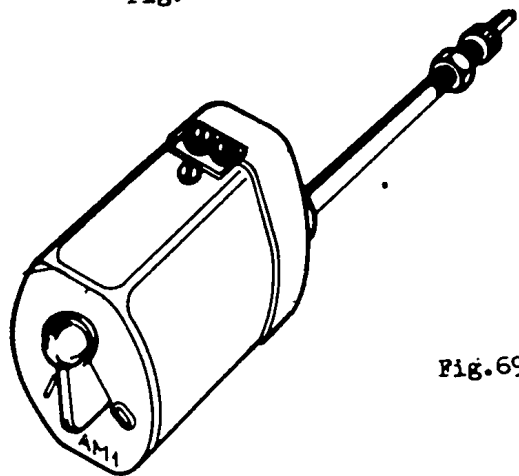


Fig.69. Wiper motor

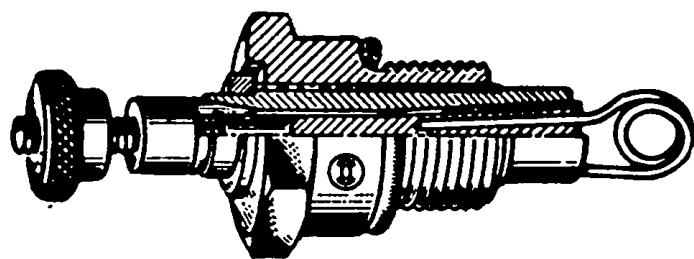


Fig.71. Section through the heater plug

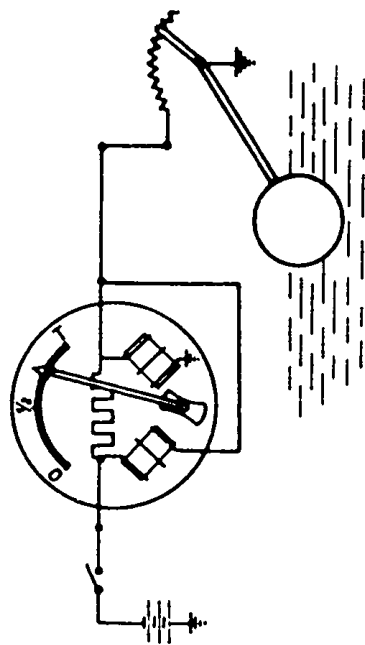
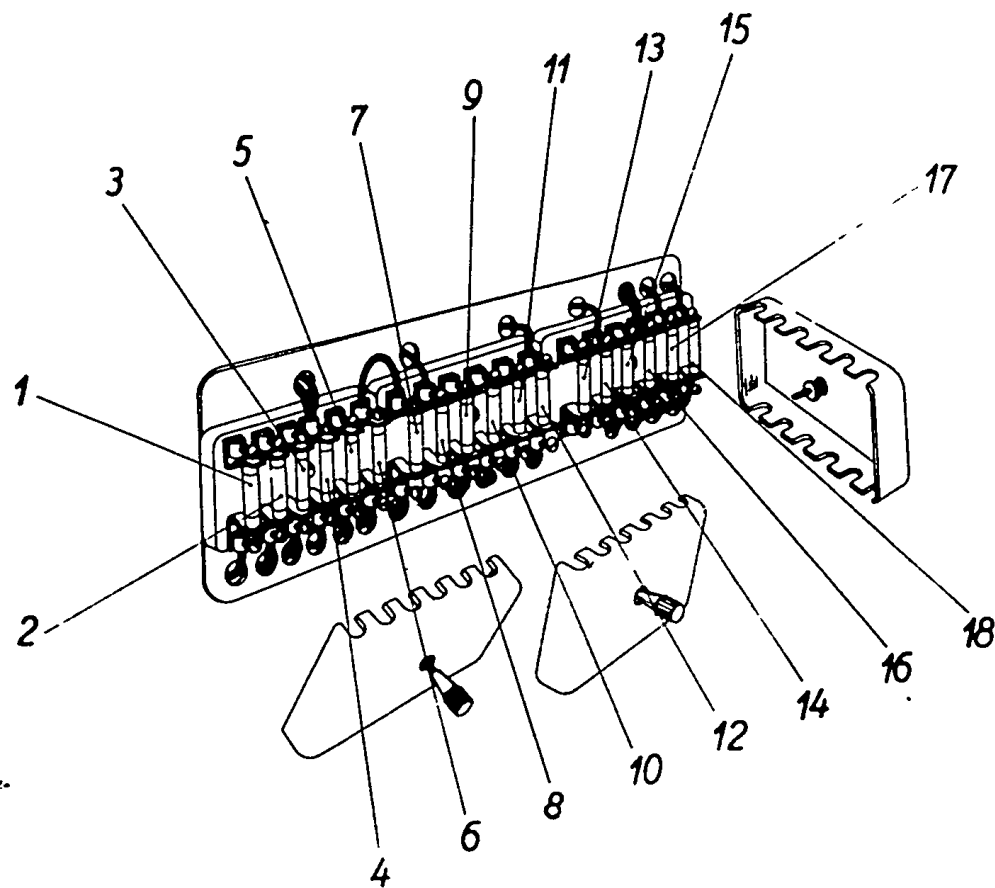


Fig.70. Diagram of the fuel gauge

Fig.72. Layout of fuses

1. Destination panel signal
2. Dipped beam
3. Road beam, left
4. Road beam, right
5. Position lamps
6. Registration mark light
7. Parking light
8. Staircase light, rear head lamp, tail light
9. Windscreen wiper
10. Indicators
11. Alighting signal, fuel gauge
12. Stop lamp, horn, signal for open door
13. Fog lamp, left
14. Fog lamp, right
15. Signal bell, hand lamp
16. Passenger compartment lighting L.
17. Driver's cab lighting
18. Passenger compartment lighting LL.



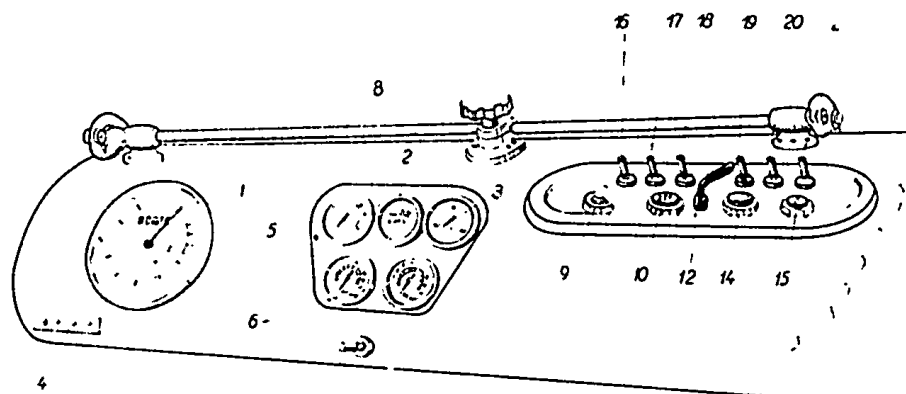
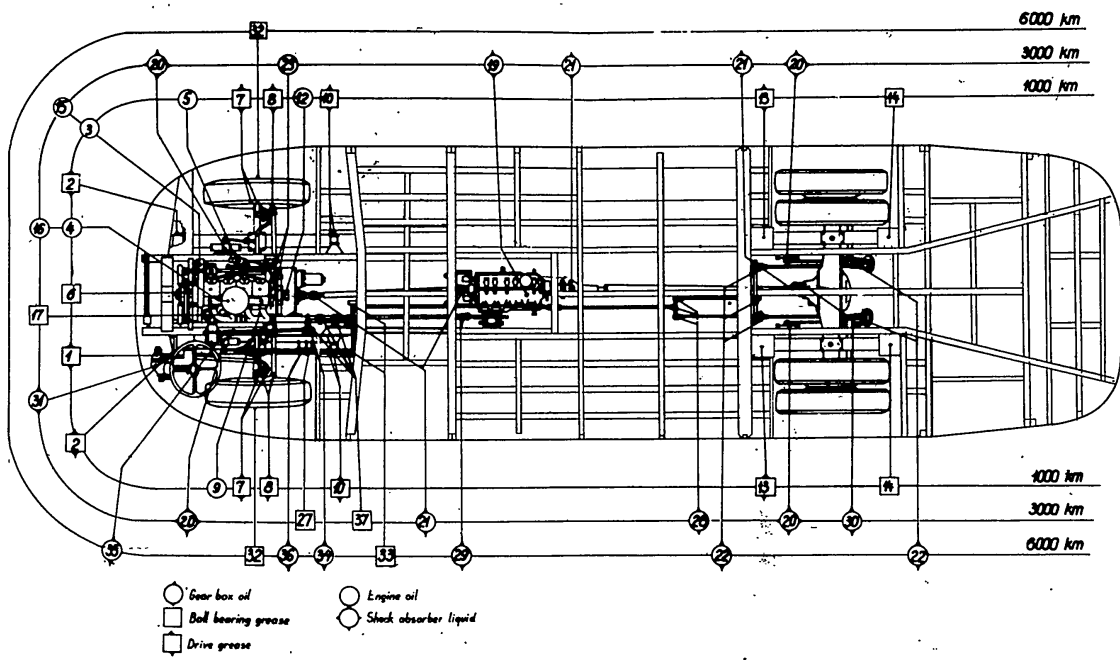
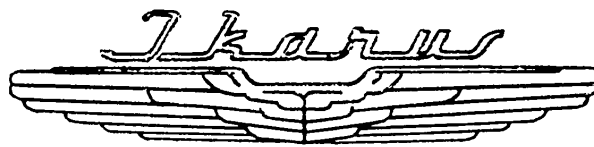


Fig 73. Instrument - and switch panel

1. Combined speedometer and distance recorder 2. Fuel gauge 3. Telethermometer 4. Warning lights 5. Oil pressure gauge 6. Air compressor gauges 7. Trafficator switch 8. Device for opening door 9. Lighting main switch 10. Heater test lamp 12. Heater starter switch 14. Battery release knob 15. Key switch box 16. 17. 18. 19. Swing switches

Fig. 74. Diagram of the lubrication





A-026

IKARUS 306

AUTOBUS

CATALOGUE OF SPARE PARTS
KATALOG DER ERSATZBESTANDTEILE
ALKATRÉSZJEGYZÉK

1958



HUNGARIAN TRADING COMPANY FOR MOTOR VEHICLES
UNGARISCHES AUSSENHANDELSUNTERNEHMEN FÜR KRAFTFAHRZEUGE
GÉPJÁRMŰ KÜLKERESKEDELMI VÁLLALAT

BUDAPEST, VI., BENCZUR UTCA 13. P. O. B. 62/249

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P R E L I M I N A R I E S

This illustrated Parts Lists shows the parts of the bus Ikarus 306.
The catalogue is made up of two parts, viz. numbered illustrated tables and complementary text. Every part represented on the picture-tables has an encircled figure No. /manufacturing No./ followed by its correct denomination as well as the number of pieces required for one assembly unit. /The symbol sz/sz employ in the column of "number of pieces" means "according to necessity".

Smaller or standardised parts, not represented in the plates, such as bolts studs, nuts, washers, pins, etc., will be found in the text under the figure number of those components to which they belong in view of assembly or as means of fixation. These parts are indicated by addition of the letters a, b, c etc. /e.g. 18/a/ to the Fig. No. the part figuring on the table.

It happens sometimes that the figure number appears in the text repeated /e.g. 9, 9-1, 9-2, etc./ This way of indication has been employed for instance in case of washers, the size of which is identical in every respect except for thickness.

The chassis and engine Nos. of the bus, the part No and the desired number of pieces should be quoted in all indents.

All data supplied are valid at the time of composition of the present List. The manufacturers reserve the right of alterations in construction, and dimensions.

Please send your comments, suggestions or remarks on possible errors to the following address : Ikarus Karosszéria és Járműgyár, Budapest, XVI., Mátyás - föld, Margit utca 2. sz.
Budapest, June 1958.

HUNGARIAN TRADING COMPANY FOR MOTOR VEHICLES

A N L E I T U N G

Die illustrierte Bestandteilliste enthält die Bestandteile des Ikarus Autobusses Typ 306.

Der Bestandteilkatalog besteht aus zwei Teilen : den illustrierten Bildertafeln und dem dazugehörigen Textteile. Bei jedem, in der Bildertafel angeführten Bestandteil ist die eingeklammerte B i l d n u m m e r /Fabriknummer/, die richtige Benennung und die zu einer Montageeinheit nötige Stückzahl angegeben. /Die Abkürzung in der Stückzahlkolonne sz/sz bedeutet : nach Bedarf./

Die in den Bildertafeln nicht illustrierten kleineren oder genormten Bestandteile /Schrauben, Müttern, Unterlagen, Splinte, usw./ sind in Textteil unter der Bildnummer desjenigen Bestandteiles zu finden, zu dessen Montage resp. Befestigung sie nötig sind. Die Bildnummer des illustrierten Teiles ist mit Buchstaben /a, b, c/ bezeichnet. /z.B. 18/a./

In Textteil kommt es öfter vor, dass sich die Bildnummern wiederholen /z.B. 9; 9-2; 9-3 usw./ Dies ist z.B. den Unterlagen angewendet werden, wenn sämtliche Masse des Stückes übereinstimmen und nur die Stärke abweicht.

Bei jeder Bestellung bitten wir die F a b r i k n u m m e r des Fahrzeuges und des Motors, die Nummer des Bestandteiles und die geforderte Stückzahl auszugeben.

Die Angaben sind zur Zeit der Zusammenstellung der Bestandteilliste gültig. Das Werk behält sich das Recht der Konstruktions-, Ausführungs- und Massänderung vor.

Bemerkungen, Ratschläge oder evtl. Korrekturen zur Bestandteilliste sind an die Adresse : Ikarus Karosseria és Járműgyár, Budapest, XVI. Mátyásföld, Margit utca 2. sz. erbeten.
Budapest, Juni 1958.

IKARUS KAROSSERIE- UND FAHRZEUGFABRIK

T Á J É K O Z T A T Ó

Az ábrán az alkatrész-jegyzék az Ikarus 206 típusú autóbuszok alkatrészeit tünteti fel.

Az alkatrész-jegyzék két részből áll, úgy mint számozott képtáblákból és a hozzátartozó szövegrészből.

A képtáblákon ábrázolt minden alkatrésznek bekarikázott ábraszám van /gyári szám/, helyes megnevezése és az egy szerelési egységhez szükséges darab száma. A darabszám rovatban abszolt sz/sz jelzés jelentése : szükség szerint.

A képtáblákon nem ábrázolt, általában kisebb vagy szabványos alkatrészek /csavarok, anyák, alátétek, szegek, stb./ a szövegrészben annak az alkatrésznek az ábraszám alatt találhatók meg, amelyekhez szerelési szempontból tartoznak, illetve a felerősítéshez szükségesek. Az ábrázolt darabnak az ábraszám a, b, c betűkkel van jelölve /pl. 1B/A/.

Többesrét elfordul, hogy a szövegrészben az ábraszám ismétlődik /pl. 9;9-1; 9;9 stb./, ezt alkalmaztuk pl. az alátétek esetében, amikor a darab minden méretében egyezik, csak a vastagsága változik.

Minden megrendelésben fel kell tüntetni az autóbusz alváz- és motor-számát, az alkatrészszámot és a kívánt darabszámot.

As adatk az alkatrész-jegyzék készítése idejében érvényesek. A gyártómi fenntartja magának a szerkezeti-, kiviteli- és mértváltási jogot.
As alkatrész-jegyzékre vonatkozó megjegyzéseket, tanácsokat vagy esetleges hibajelzéseket kérjük az Ikarus Karosszéria és Járműgyár, Budapest, XVI. Mátyásföld Margit utca 2.sz. címre beküldeni.
Budapest, 1958. június hó.

IKARUS KAROSSZÉRIA ÉS JÁRMŰGYÁR

TECHNICAL DATA

1. MAIN DIMENSION OF THE BUS		2. ENGINE	
Wheel base	5000 mm	Type	Csepeľ D 414
Front track	1740 mm	Number of cylinders	4
Rear track	1720 mm	Bore	112 mm
Overall length	9155 mm	Stroke	140 mm
Overall width	2500 mm	Piston displacement	5517 cm ³
Total height	2765 mm	Compression ratio	18:1
Turning circle diameter	21 m	Maximum output at 2200r.p.m.	95 HP
Ground clearance under front axle	370 mm	Maximum torque	34 mkg
Ground clearance under rear axle	240 mm	Firing sequence	1-3-4-2
Empty weight / fuel tank filled up		Injection advance	D. D. C.
with spare wheel, without driver		with Bosch-pump	20° ± 1°
Ver	6000 kg	Valve clearance	
Maximum permissible gross weight	9200 kg	with cold engine/	0,2 mm
Maximum road speed	76 km/h	Suction valve opens before top	20° 30'
Wheel rim size	5,00 S-20	Suction valve closes after	71° 10'
Tyre size	8,50 - 20	Exhaust valve opens before	50° 30'
Tyre inflation pressure	5,75 kg / cm ²	Exhaust valve closes after	41° 10'
		top dead centre of	

Fuel fine filter MOM type with felt filter, pad
 Injection pump Bosch PE 4B 59E 410 S 795
 Sense of rotation from the drive right
 Nozzle holder Bosch BOSD 21
 Nozzle 1.5 kg/cm²
 Injection pressure 3-5 kg/cm²
 Oil pressure
 Oil capacity of the crank-case 14 litres

3. COOLING SYSTEM
 Radiator capacity about 25 litres

4. WATER PUMP
 Type vane type impeller
 Arrangement on the left-hand side of the engine
 Drive by the dynamo through V-belt pulley

5. CLUTCH System single-plate, dry

6. GEAR BOX
 Type Alba B II hand-operated gear-change mechanism, four forward speed and one reverse

Gear ratios and corresponding speed limits:

1st speed	1:5.01	14.9 km/h
2nd speed	1:2.95	23.2 km/h
3rd speed	1:1.88	47.2 km/h
4th speed	1:1.2	76.8 km/h
Reverse	1:6.5	11.3 km/h

Amount of the lubricant in gear box 8.0 litres
 in the remote control mechanism 1.0 litres

7. REAR AXLE
 Transmission ratio of final drive 1 : 5.14
 Number of teeth on crown wheel 36
 Number of teeth on bevel pinion 7
 Amount of lubricant 8 litres

8. UNIVERSAL JOINT PROPELLER SHAFT
 Type needle roller
 Diameter of propeller shaft tube 60-70 mm

9. SPRINGS

	Front	Rear	Rear-auxiliary
Number of spring leaves	9	12	6
Width of spring leaves	100 mm	100 mm	100 mm
Thickness of spring leaves	8-9 mm	8-9 mm	8 mm

10. FRONT AXLE
 Toe-in as measured on the brake drum edge 2-4 mm

11. STEERING GEAR
 Type Globoid cam and double roller

Transmission ratio 1:24
 Diameter of steering wheel 450-500mm
 Amount of lubricant 0.75 litre

12. BRAKE SYSTEM
 Pneumatic two-circuit diaphragm-type brake
 Diameter of front brake diaphragm 130 mm
 Diameter of rear brake diaphragm 150 mm
 Total braking area 3170 cm²
 Hand brake operation mechanical

13. ELECTRIC EQUIPMENT
 Dynamo Type Ij/Gk 300/24/1300 Bosch Ar7
 Rated output 300 W
 Voltage regulator Make Bosch BS/VE 300/24/1
 Starter motor Make Bosch
 Storage battery Type BNG 4/24/GRS 165 Tudor GS7G
 Output 120 A/h
 Charging current 12 A/h
 Heater plug 1.7 V 30-40 A

Bulbs	Type	Mark
Head light	24 V 35/55W Bilux	BA 20d
City light	24 V 5W	Small bulb BA 15s
Trafficator front	24 V 15W	BA 15s
side	24 V 10W	BA 15s
rear	24 V 15W	BA 15s

Trafficator	Type	Mark
Pilot	24 V 2W	10/19x12
Filament	24 V 5W	One-pole BA 15s
Position light	24 V 10W	One-pole BA 15s
Ceiling lamp	24 V 10W	BA 15s
Stop light	24 V 10W	BA 15s
/tail light	24 V 10W	BA 15s
Number-plate light	24 V 5W	Soffets 38 mm 58 BA 7S
Panel light	24 V 1,2W	

TECHNISCHE ANGABEN

1. HAUPTMASSE DES AUTOBUSSES

Achsenabstand	5000 mm
Vordere Spurweite	1740 mm
Hintere Spurweite	1720 mm
Gesamtlänge	5155 mm
Gesamtbreite	2500 mm
Gesamthöhe	2765 mm
Wendekreisdurchmesser	24 m
Bodenfreiheit vorne	370 mm
Bodenfreiheit unter der Hinterbrücke	240 mm
Leergewicht / voller Kraftstoffbehälter, Reserverrad, jedoch ohne Fahrer	6000 kg
Zulässiges Gesamtgewicht	9200 kg
Höchstgeschwindigkeit	76 km/h
Feigenmass	5,00-20
Reifenmass	5,50-20
Reifendruck	Extra HB 5,75 Atü

2. MOTOR

Type	Csepel D 414
Zylinderzahl	112
Bohrung	140 mm
Hub	140 mm
Hubvolumen	5517 cm ³
Verdichtungsverhältnis	15:1
Höchstleistung bei 2200 U/min	95 PS
Maximales Drehmoment	34 mkg
Zündfolge	1-3-4-2
Einspritzbeginn vor dem oberen Totpunkt bei einer Bosch-Pumpe	20° ± 1°
Ventilspiel / bei kaltem Motor/ Saugventil öffnet vor dem oberen Totpunkt	0,2 mm
Saugventil schliesst nach dem unteren Totpunkt	22° 30'
Auspuffventil öffnet vor dem unteren Totpunkt	71° 10'
	52° 30'

Auspuffventil schliesst nach 410 10' dem oberen Totpunkt Fabrikat Kraftstoff-Feinfilter MOM mit Filzeinlage Fabriknummer und Type dgr. Einspritzpumpe Bosch PE 4B 80E 410 S 775 Einspritzpumpe rechts Bosch PE 4B 80E 410 S 775 Antriebsseitige Drehrichtung Csepel Düse Bosch DMSD 21 150 kg/m² Einspritzdruck 5-6 Atm Öldruck 5-6 Atm Ölaufüllung des Motors 14 l

3. KÜHLSYSTEM /Lüfter/

Volumen des Kühlsystems etwa 25 l

4. WASSERPUMPE

Type flügelrad an der Linkseite des Motors Antrieb von der Dynamo durch Keilriemenscheibe

5. KUPPLUNG

System der Kupplung Einscheiben-Trockenkupplung

6. GETRIEBE

Type "Alfa B II" Handgetriebe mit 4 Vorwärts- und 1 Rückwärtsgang
 Überstufungen im Getriebe:
 1. Gang 1: 5,01 14,9km/St
 2. Gang 1: 2,98 24,2km/St
 3. Gang 1: 1,98 34,3km/St
 4. Gang 1: 1,76 39,7km/St
 Rückwärtsgang 1: 6,5 11,2km/St
 Schmieröl - Füllmenge 8 Liter
 Bein Fernschalter 1 Liter

7. HINFRACHSE

Untersetzung 1: 5,14
 Zahnzahl des Tellerades 26
 Zahnzahl des Kegelrades 7
 Schmieröl - Füllmenge 8 Liter

8. KREUZGELENK, GELENKWELLE

Type mit Nadelrollen
 Rohrdurchmesser 60 - 70mm

9. FEDERANGABEN

	Vorderfeder	Hinterfeder	hintere Zusatzfeder
Anzahl der Federblätter	9	12	6
Breite der Federblätter	100mm	100mm	100mm
Stärke der Federblätter	8-9mm	8-9mm	8-9mm

10. VORDEESES FAHRGESTELL

Radvorlauf, gemessen am Bremsstrommelrad 2-4mm

11. LENKUNG

Type Schnecken- und Doppelrollen-Globoid - Lenkung
 Übersetzung 1: 24
 Lenkrod-Durchmesser 450 oder 500 cm
 Schmieröl-Füllmenge 0,75 l

12. BREMSANLAGE

Doppelstromkreis - Membran - Luftdruckbremse

Radbremsenmembran-Durchmesser vorn 130 mm hinten 150 mm
 Gesamtbremsfläche 2170 cm²
 Betätigung der Handbremse mechanisch

13. ELEKTRISCHE AUSRÜSTUNG

Lichtmaschine Type L1/GK 300/24 1300 18 7
 Spannungsregler Marke RS/VE 300/24/1 Bosch
 Anlasser Marke RS/VE 300/24/1 Bosch
 Akkumulator Type ENG 4 24/GRS 163 Tudor 6E78
 Kapazität 195 A/h
 Ladestrom 11 A/h
 Zündkerzen 1,7 34-40a
 Glühlampen Type: Scheinwerferleuchte 24V35/55W Bilux BA 20 d
 Stadtlucht 24 V 5W Kirchenglühlampe BA 15 s
 Blinklichtlampe vorn 24 V 15W BA 15 s
 an der Seite 24 V 10W BA 15 s
 hinten 24 V 15W BA 15 s
 Lampe zum Fahrtrichtungsanzeiger 24 V 5W /10/19x12

Standlicht-Lampe 24 V 5W BA 15s unipolar
 Deckenlicht-Lampe 24 V 10W BA 15s unipolar
 Bremslicht-Lampe 24 V 10W BA 15s

Nummern-Lampe 24 V 5 W BA 15s Sof-
 fittenlampe 36m/mS8
 Instrumentenbrett-
 Innenleuchte 24 V 1,2W BA 7 s

M Ű S Z A K I A D A T O K

1. AZ AUTÓBUSZ FŐMÉRTEI		2. MOTOR	
Tengelytáv	5000 mm	Típus	Csepel D 414
Mellsőnyomás	1730 mm	Hengerek száma	4
Hátó nyomás	1720 mm	Furát	112
Jármű teljes hossza	6155 mm	Lökét	140 mm
Jármű teljes szélessége	2785 mm	Sűrűség viszony	18:1
Jármű teljes magassága	2785 mm	Lökettérifogat	5517 mm
Ferulókör átmérő	21 m	Legnagyobb teljesítmény 2200 ford./percnél	95 LE
Skabed magasság a melles ten- kely alatt	376 mm	Legnagyobb nyomaték	34 mkg
Skabed magasság a hátsó hid a- lalt	240 mm	Hővezetésűség kérdési felad hólpont előtt Bosch szti- ratívumál	20° ± 1°
Teljes súly /üzem alatt feltöl- ve, pótkerék, vészfék nélkül/	6000 kg	Gyújtási sorrend	1-3-4-2
Megengedett összsúly	9200 kg	Szélesség /hideg motornál/	0,2 mm
Max. sebesség	76 km/óra	Szivácsolás nyit felad holt- pont előtt	22° 30'
Kerékpánt méret	5,00 S -20	Szivácsolás nyit alsó holtpont után	71° 10'
Gumiabroncs méret	8,50 -20	Kipufogószelvény nyit az alsó holtpont előtt	52° 30'
Nyomás a gumibroncsban	3,75 At		

Kipufogószelvény zárrifelő 41° 10'
 Boltpont után MOM gyártmány
 Típusa gáztanúsított
 Befecskendező szivattyú Bosch PE 4B
 gyártmánya és típusa 80E 410S 735

Forgási irány a hajtás felől jobbra
 Fűrdőstartó Bosch BOSCH 21
 Fűrdő 135 kg/cm²
 Befecskendezési nyomás 7-9 At
 Olajnyomás 14 liter
 Motor olajfeltöltése

3. HŰTŐRENDSZER

Hűtési berendezés tartalmán kb 25 liter

4. VÍZSZIVATTYÚ

Típusa lapátkerekes
 Elhelyezése motorbal oldalon
 Hajtása dinamóról
 aksziátorcsával

5. TENGELYKAPCSOLÓ

Tengelykapcsoló rendszerre egytárcsás szá-
 ras.

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6. SEBESSÉGVÁLTÓMŰ

Típusa "Alba B II" 4 előre, 1 hátra sebes
 séges, kézikapcsolású váltómű
 Áttételés a sebességváltón:
 1. sebesség 1:5,01 14,9 km/h
 2. sebesség 1:2,93 22,8 km/h
 3. sebesség 1:1,58 41,8 km/h
 4. sebesség 1:1 46 km/h
 hátramenet 1:6,5 11,5 km/h

Kendőolajmennyiség 8 liter
 Tápkapcsolóáll. 1 liter

7. HÁTSÓHID

Hajtómű áttételi viszony 1:5,14
 Tányérek fogszáma 26
 Kupák fogszáma 7
 Kendőolaj mennyisége 8 liter

8. KARDÁNCUKLÓ, KARDÁNTENGELY

Típusa
 Csőtárcsák 50-70 mm

9. RUGÓADATOK

	mellső rugó	hátsó főrugó	hátsó segédrugó
Rugólapok száma	9	12	6
Rugólapok szélessége	100mm	100mm	100 mm
Rugólapok vastagsága	8-9mm	8-9mm	8 mm

10. MELLŐS FÜTŐMŰ

Kerékösszetartás a fékdob peremén mérve 2-4 mm

11. KORMÁNYMŰ

Típus Globoid csiga és kettős
 Áttételi viszony 8/12
 Kormánykerék átmérője 450-500 mm
 Kendő olaj mennyisége 0,75 l

12. FÉKRENDSZER

Kétáramkörös membrános légfék
 Kerékfékmembrán átmérője mellső 120mm
 hátsó 150mm
 Összes kerékek fékfelülete 3170 cm²
 Készítők működtetése mechanikus

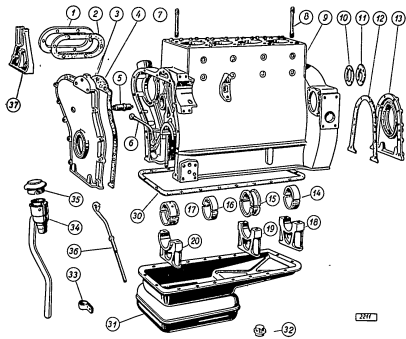
13. VILLAMOSBERENDEZÉS

Dinamó Bosch
 Gyártmány Iy/UK 300/24/1300 AR7
 Típus 300 W
 Névleges teljesítmény
 Feszültség szabályozó Bosch RS 300/24/1
 Gyártmány
 Indítómotor Bosch
 Gyártmány BNG 4/24 GRS 163
 Típus
 Akkumulátor 6K7C
 Típus 105 A/6
 Kapacitás 11 A/6
 Töltőáram 1,7 34-40a
 Isztógyertya
 Iszák típus jelzés
 Fényesdró iszák 24 V 35/55 W Bilux BA 20 d

Városi lámpa izzó	24 V 5 W	cseresznye	Mennyzetlámpa izzó	24 V 10 W	egypl. BA 15e
		BA 15e	Féklámpa izzó	24 V 10 W	BA 15e
Villogólámpa izzó	24 V 15 W	BA 15e	Rendszám tábla izzó	24 V 5 W	Soffita 38 mm S8
elő	24 V 15 W	BA 15e	Műszer beábrás vilá-	24 V 1,2W	BA 7S
hátsó	24 V 15 W	BA 15e	gítás izzó		
Oldalt	24 V 10 W	BA 15e			
Irányjelző kapoc. izzó	24 V 3 W	/10/ 19x12			
Helyzetlámpa izzó	24 V 5 W	egypl. BA 15e			

L-I.

Crankcase, Oil pan
Kurbelgehäuse, Ölwanne
Forgattyúház, olajteknő



L-1.

Fig. No. / Abra	No. / Sz.	Description / Besemung / Megnevezés	Po. / St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
CRANKCASE, OIL PAN -- KURBELGEHÄUSE, ÖLWANNE -- FORGATTUHÁZ -- OLAJTÉKÓ				
	D 414	Four-cylinder engine with compressor -- Vierzylinder - Motor vollst. mit Luft - kompressor -- Négyhengeres motor lég- sűrítővel, komplett	1	
1	413,9,01.135	Side cover -- Seitlicher Deckel -- Ol- dalsó fedél	2	
1a	MS MSz 2210	Lock washer - side cover -- Federring zum Seitendeckel -- Rugós alátét az oldalfedélhez	12	
1b	MS MSz 2261	Flat nut-side cover -- Flachmutter blank zum Seitendeckel -- Alacsony fényes anya az oldalfedélhez	12	
2	413,9,01.100	Gasket-side cover -- Dichtung zum Sei- tendeckel -- Tömítés az oldalé- fedélhez	2	

1	2	3	4	5
-	ESZ-413.01/2	Timing cover, complete -- Kompletter Vorderdeckel -- Mellső fedél, teljes	1	
3	413.1.01.90	Timing cover with spring sleeve -- Vorderdeckel, ausgebüchset -- Mellső fedél perselyezve	1	
3a	413.1.01.93	Timing cover -- Vorderdeckel -- Mellső fedél	1	
3b	613.1.01.88	Threaded sleeve-front and rear covers -- Gewindebüchse zum Vorder- und Hinterdeckel -- Menetes persely a mellső és hátsó fedélhez	4	
3c	8.280 MSz 2218	Cylindrical piston timing cover -- Pasztift zum Vorderdeckel -- Illesztőcszeg a mellső fedélhez	2	
3d	A75x100 MSz 7894	Lip-type oil seal timing cover -- Stulp-lidring zum Vorderdeckel des Kurbelgehäuses -- Karszalony szatlygyűrű a forgattyúház mellső fedélhez	1	
3e	MS MSz 2210	Lock washer -- timing cover -- Federling zum Vorderdeckel des Kurbelgehäuses -- Rugós alátét a forgattyúház mellső fedélhez	8	
3f	MS MSz 2260	Hexagon nut-timing cover -- Sechskantmutter zum Vorderdeckel des Kurbelge-	8	

1	2	3	4	5
		háness -- Hatlapu f.anya a forgattyúház mellső fedélhez		
4	413.9.01.66	Gasket-front cover -- Dichtung des Vorderdeckels des Gehäuses -- Tömítés a háts mellső fedélhez	1	
5	413.1.01.96	Spring casing-timing cover complete -- Komplettes Federgehäuse zum Vorderdeckel -- Rugóház a mellső fedélhez, teljes	1	
5a	413.1.01.99	Spring casing-timing cover -- Federgehäuse zum Vorderdeckel -- Rugóház a mellső fedélhez	1	
5b	413.1.01.100	Button-head spigot grub screw -- Rundkopf-Gewindestift -- Gombvégi csaposhernyőcsavar	1	
5c	213.0.01.59	Spring-timing cover -- Feder zum Vorderdeckel -- Rugó a mellső fedélhez	1	
5d	17/32" III MSz 7870	Press ball-timing cover -- Druckkugel zum Vorderdeckel des Gehäuses -- Nyomógolyó a forgattyúház mellső fedélhez	1	
5e	MSr1 MSz 2291	Fine-threaded flat nut -- Flachmutter blank mit Feingewinde -- Finommenetű alacsony f. anya	1	

1	2	3	4	5
6	413.9.01.149	Oil conduct-rqd gear lubrication, complete Komplette Öllösung zur Pleuelstange -- Ölajvezeték a toldórúd olajozá- sához, teljes	1	
6a	B6 DIN 7623	Hollow screw -- Hohlschraube sur Üllel- tung -- Üreges csavar az olajveze- tékhez	2	
6b	A 12x16 41 MSz 18716	Sealing ring-oil pipe -- Dichtungsring sur Ülleltung -- Tömítőgyűrű az o- lajvezetékhez	4	
7	413.9.01.11	Stud, short-cylinder head -- Kurze Stift- schraube zum Zylinderkopf -- Rövid aszokosavar a hengertőjhez	8	
8	413.9.01.12	Stud, long-cylinder head -- Lange Stift- schraube zum Zylinderkopf -- Hosszú aszokosavar a hengertőjhez	8	
-	ES4-413.01/1	Crankcase with bearing cups and studs -- Kurbelgehäuse mit Lagertassen und Stiftschrauben -- Forgattyúháza csap- ágyakozókkal és aszokosavarral	1	
9	413.9.01.151	Crankcase -- Kurbelgehäuse -- For- gattyúháza	1	
9a	413.9.01.108	Stud-bearing cup -- Stiftschraube zum Lagerdeckel -- Aszokosavar a csap- ágyfedélhez	10	

1	2	3	4	5
9b	M8x16 DIN 940	Stud-rear camshaft cover -- Stiftschrau- be zum Hinterdeckel der Nockenwelle -- Aszokosavar a bityktengely hátsó fe- délhez	4	Valid with gültig mit érvényes 413.01.49-cel
9c	M8x15 DIN 940	Stud-side cover -- Stiftschraube zum Seitendeckel -- Aszokosavar az oldal- só fedélhez	11	
9d	M8x30 DIN 940	Stud-rear cover -- Stiftschraube zum Hinterdeckel -- Aszokosavar a hátsó fedélhez	10	
9e	M8x30 DIN 940	Stud-timing cover -- Stiftschraube zum Vorderdeckel -- Aszokosavar a mellő fedélhez	7	
9f	413.1.01.186	Stud with bore-timing cover -- Hohl- stiftschraube zum Vorderdeckel -- Aszokosavar furattal a mellő fedélhez	1	
9g	M10x75 MSz 2404	Stud-dynamo bracket -- Stiftschraube zum Lichtmaschinenbügel -- Aszokosavar a dinamókönyvelhez	4	
9h	M10 MSz 2255	Hexagon nut -- Kleinkantmutter, blank -- Kilapítórú f.anya	4	
9i	M8x55 DIN 940	Stud oil pump -- Stiftschraube sur Öl- pumpe -- Aszokosavar az olajszivattyú- zúhoz	4	

1	2	3	4	5
9j	M10x20 MSz 2404	Stud-oil pan -- Stiftschraube zur Ölwanne -- Aszokosavar az olajteknőhöz	13	
9k	413.1.01.204	Stud with bore-oil pan -- Hohlstiftschraube zur Ölwanne -- Aszokosavar furaltal az olajteknőhöz	1	
9l	M10x50 DIN 940	Stud-clutch housing -- Stiftschraube zum Schaltgehäuse -- Aszokosavar a kapcsolóházhoz	9	
9m	M10x105 DIN 940	Stud-water pump housing -- Stiftschraube zum Wasserpumpen-Gehäuse -- Aszokosavar a visszivattyúházhoz	2	
9n	M12x20 DIN DIN 940	Stud-rear engine support -- Stiftschraube zur hinteren Motoraufhängung -- Aszokosavar a motor hátsó felfüggesztéséhez	8	
9o	M12x70 DIN 940 6head	Studfront engine support -- Stiftschraube zur vorderen Motoraufhängung -- Aszokosavar a motor mellő felfüggesztéséhez	3	
9p	M8x25 DIN 940	Stud-front side cover -- Stiftschraube zum vorderen Seitendeckel -- Aszokosavar az elülső oldalfedélhez	1	
9r	M10 MSz 2210	Lock washer -- Federring -- Rugós alátét	23	

1	2	3	4	5
9s	M10 MSz 2260	Hexagon nut -- Sechskantmutter, blank -- Hatlapu f.anyu	11	
9t	M10 MSz 2201	Washer -- Unterlagscheibe -- Fényes alátét	2	
9u	M12 MSz 2255	Hexagon nut -- Kleinkantmutter -- Kleinalpu f.anyu	11	
9v	M12 MSz 2210	Lock washer-front engine support -- Hohlstiftschraube zur Ölwanne -- Rugós alátét a motorhoz mellő felfüggesztéshez	3	
9x	213.0.01.36	Insert tube-push rod passage -- Verbindungrohr -- Üszekötőcső toldórúd átérésztéshez	8	
9y	413.9.01.169	Insert tube-water passage -- Steckrohr zum Kühlwasserdurchlauf -- Betétcső a vizátömlesztéshez	8	
9z	213.0.01.109	Sealing ring-pushrod passage tube -- Dichtungsring zum Verbindungsrohr -- Tömítőgyűrű a toldórúd átérésztéshez	8	
9aa	213.0.01.113	Sealing ring-water passage tube -- Dichtungsring zum Wasser-durchlassrohr -- Tömítőgyűrű a vizátérésztéshez	12	
9ab	413.9.01.30	Insert tube-oil pump housing -- Verbin-	2	

1	2	3	4	5
		düngerohr zum Ölwanne-Gehäuse -- Üm- szekötőcső az olajszivattyúházhoz	2	
9ac	413.9.01.94	Pressure reducing nipple-oil duct /timing side/ -- Reduzierdübel mit Gewinde zur Vorderseite der Ölleitung -- Ny- omáscsökkenő nyeres hűvelő az olajve- zetékhez mellés old.	1	
9ad	413.9.01.130	Plug- crankcase /fly-wheel side/ -- Ver- schlusschraube am Kurbel-Gehäuse /Schwungradseite/ -- Zárócsavar a sz- egíttyűházas /lendkerék old./	2	
9ae	MSz 18716 A14x18 A1	Sealing ring-plug /fly-wheel side/ -- Dichtungerring zur Verschluss - Schrau- be /Schwungradseite/ -- Tömítógyűrű a zárócsavarhoz /lendkerék old./	2	
9af	M18x1.5 DIN 71022	Threaded plug-oil duct of the crankcase front bearing -- Schliffstopfen zur Ölleitung des vorderen Lagers des Kur- belgehäuses -- Menetes dugó, for- gattyúház mellés csapgy olajvezeték- hez	1	
9ag	413.9.01.131	Plug-oil duct in engine compartment /dy- namo connection/ -- Verschluss- Schraube zur Ölleitung des Motorge- häuses /Lichtmaschinenanschluss/ -- Zárócsavar a motorház olajvezetékhöz	1	

1	2	3	4	5
		/dynamócsatlakozó/		
9ah	E18x22 Cu MSz 18716	Sealing ring-screw plug /dynamo connection/ -- Dichtungerring zur Verschluss-Schrau- be /Lichtmaschinenanschluss/ -- Töm- ítógyűrű a zárócsavarhoz /dynamócsat- lakozás/	1	
9ai	213.0.04.89	Stopper head-crankcase -- Kernlochver- schluss am Kurbelgehäuse -- Mag- lyukelzáró a forgattyúházhoz	8	
9aj	413.9.01.153	Insert tube-cooling water passage -- Steckrohr zum Wasserdurchlauf -- Be- tétőcső a víz átvezetéséhez	4	
9ak	M6x8 MSz 2421	Tapered grub screw-crankcase -- Kegel- Gewindeschraube zum Kurbelgehäuse -- Kúpos hernyócsavar a forgattyúházhoz	9	
9al	413.9.01.172	Union sleeve-oil duct /front side/ -- Ver- bindungsgehäuse zur Ölleitung /Vorder- seite/ -- Csatlakozó hűvelő az o- lajvezetékhez /mellés oldal/	1	
9am	A4 DIN 7621	Union banjo-oil pressure pipe -- Ring- sanaték zur Verbindungsgehäuse des Öl- drückes -- Gyűrűs toldat az olajnyo- más csatlakozóhoz	1	
9an	AM10x1	Locknut-oil pressure gauge connection --	1	

1	2	3	4	5
	DIN 7605	Verriegelungsmutter zur Verbindungshülse des Öldruckes -- Záróanyá az olajnyomás csatlakozóhoz	1	
9ao	M10x14 A1 MSz 18716	Sealing ring-oil pressure gauge connection -- Dichtungering zur Verbindungshülse des Öldruckes -- Tömítógyűrű az olajnyomás csatlakozóhoz	13	
9ap	413.9.01.168	Adapter-oil pressure gauge connection -- Hőlycschraubenstutzen zum Öldruckmesser -- Helyes csavartoldal az olajnyomás csatlakozóhoz	1	
9ar	413.1.01.219	Dowel pin-coupling case -- Pass-Stift zum Schützgehäuse -- Illesztőszeg a kapcsolóházhoz	2	
9as	413.9.01.14	Threaded bush-injection pump and oil filter housing -- Gewindebüchse zur Einspritzpumpe und zur Befestigung des Öl-siebgehäuses -- Menetes persely a befecskendezőszivattyúhoz és az olajszűrő-ház megerősítéséhez	8	
9at	M10 MSz 2202	Washer to 9g -- Linsebellagscheibe zu 9g -- Lemecses alátét 9g tételhez	4	
10	413.9.01.88	Gasket rear camshaft cover -- Dichtung zum Hinterdeckel des Nockenwellengehäuses -- Tömítés a bitykös tengely	1	

1	2	3	4	5
		hátsó fedélhez		
11	413.01.2749	Rear cover-camshaft -- Hinterdeckel des Nockenwellengehäuses -- Hátsó fedél a bityköstengelyhez	1	
11a	M8 MSz 2210	Lock washer-camshaft cover -- Federring zum Nockenwellendeckel -- Rugós alátét a bityköstengely fedélhez	4	
11b	M8 MSz 2260	Hexagon nut-camshaft cover -- Sechskantmutter zum Nockenwellen-Deckel -- Hátlapu f.anyá a bityköstengely fedélhez	4	
12	413.9.01.69	Gasket-rear crankcase cover -- Dichtung zum Hinterdeckel des Kurbelgehäuses -- Tömítés a forgattyús hátsó fedélhez	1	
13	413.1.01.275	Rear cover with bushing -- Hinterdeckel ausgebüchst -- Hátsófedél perselyes fedél	1	
13a	413.1.01.280	Rear cover -- Hinterdeckel -- Hátsó fedél	1	
13b	M8 MSz 2210	Lockwasher-rear cover -- Federring zum Hinterdeckel -- Rugós alátét hátsó fedélhez	10	
13c	M8 MSz 2260	Hexagon nut-rear -- Sechskantmutter zum Hinterdeckel -- Hátlapu f.anyá alátét fedélhez	10	

1	2	3	4	5
13d	8x20 MSs 2218	Dowel pin-rear cover -- Pass-Stift zum Hinterdeckel -- Illesztőszeg a hátsó fedélhez	2	
14	413.9.01.113	Pair of shells-fly wheel bearing -- Lager-schalennpaar /Schwungrad-Lager/ -- Csapágy csészepár /lendkerék csapágy/	1	
14a	413.9.01.89	Hollow pin-shell of fly-wheel bearing -- Hohlstift zur Schwungrad Lagerachse -- Üreges csap a lendkerék csapágyrészhez	1	
14-1	413.9.01.213	Pair of shells-fly wheel bearing / 84,8 undersize/ -- Lager-schalennpaar /Schwungrad-Lager/ /84,8 Stufe/ -- Csapágy csészepár /lendkerékcsapágy/ /84,8 tulmért/	1	
14-2	413.9.01.313	Pair of shells-fly wheel main bearing / 84,6 undersize/ -- Lager-schalennpaar /Schwungrad-Lager/ /84,6 Stufe/ -- Csapágy csészepár /lendkerékcsapágy/ /84,6 tulmért/	1	
14-3	413.9.01.413	Pair of shells-fly wheel main bearing / 84,8 undersize/ -- Lager-schalennpaar /Schwungrad-Lager/ /84,8 Stufe/ -- Csapágy csészepár /lendkerékcsapágy/ /84,8 tulmért/	1	

1	2	3	4	5
14-4	413.9.01.513	Pair of shells-fly wheel main bearing / 84 undersize/ -- Lager-schalennpaar /Schwungrad-Lager/ /84 Stufe/ -- Csapágy csészepár /lendkerékcsapágy /84 tulmért/	1	
14-5	413.9.01.613	Pair of shells-fly wheel main bearing / 85,5 undersize/ -- Lager-schalennpaar /Schwungrad-Lager/ /85,5 Stufe/ -- Csapágy csészepár /lendkerék csapágy/ /85,5 tulmért/	1	
15	413.9.01.111	Pair of shells-main guide bearing -- Lager-schalennpaar /Passlager/ -- Csapágy csészepár /ill. sz. felt. csapágy/	1	
15-1	413.9.01.211	Pair of shells-main guide bearing / 84,5 undersize/ -- Lager-schalennpaar /Passlager/ /84,5 Stufe/ -- Csapágy csészepár /illesztett csapágy /84,5 tulmért/	1	
15-2	413.9.01.311	Pair of shells-main guide bearing / 84,6 undersize/ -- Lager-schalennpaar /Passlager/ /84,6 Stufe/ -- Csapágy csészepár /illesztett csapágy /84,6 tulmért/	1	
15-3	413.9.01.411	Pair of shells-main guide bearing / 84,6 undersize/ -- Lager-schalennpaar /Passlager/ /84,6 Stufe/ -- Csapágy csészepár	1	

1	2	3	4	5
15-4	413.9.01.511	szepár / illesztett csapágy, ϕ 84,4 tul- méret / -- Lagerachsenpaar / Mit- tellaeger / ϕ 84 Stufe / -- Csapágy csé- szepár / illesztett csapágy, ϕ 84 tul- méret	1	
15-5	413.9.01.611	Pair of shells-main guide bearing /83,5 undersize/ -- Lagerachsenpaar / Mit- tellaeger / ϕ 83,5 Stufe / -- Csapágy csé- szepár / illesztett csapágy, ϕ 83,5 tulméret	1	
16	413.9.01.114	Pair of shells-main middle bearing -- Lagerachsenpaar / Mittellaeger / --Csap- ágy csészepár / középső csapágy /	2	
16-1	413.9.01.214	Pair of shells-main middle bearing /84,8 undersize/ -- Lagerachsenpaar / Mit- tellaeger / ϕ 84,8 Stufe / -- Csapágy csészepár / középső csapágy ϕ 84,8 tulmé- ret /	2	
16-2	413.9.01.314	Pair of shells - main middle bearing /84,6 undersize/ -- Lagerachsenpaar / Mit- tellaeger / ϕ 84,6 Stufe / -- Csapágy csészepár / középső csapágy ϕ 84,6 tulmé- ret /	2	
16-3	413.9.01.414	Pair of shells-main middle bearing /84,4	2	

1	2	3	4	5
16-4	413.9.01.514	undersize/ -- Lagerachsenpaar / Mit- tellaeger / ϕ 84,4 Stufe / -- Csapágy csészepár / középső csapágy ϕ 84,4 tul- méret /	2	
16-5	413.9.01.614	Pair of shells-main middle bearing /83,5 undersize/ -- Lagerachsenpaar / Mit- tellaeger / ϕ 83,5 Stufe / -- Csapágy csészepár / középső csapágy ϕ 83,5 tulmé- ret /	2	
17	413.9.01.112	Pair of shells-main front bearing -- La- gerschalenpaar / Vorderlager / -- Csap- ágy csészepár / mellő csapágy /	1	
17a	413.9.01.22	Dowel pin-bearing shell -- Pass-Stift zur Lagerschale -- Illesztőcsap a csapágy csészében	8	
17-1	413.9.01.212	Pair of shells-main front bearing /84,8 undersize/ -- Lagerachsenpaar / Vor- derlager / ϕ 84,8 Stufe / -- Csapágy csé- szepár / mellő csapágy ϕ 84,8 tulmé- ret /	1	
17-2	413.9.01.312	Pair of shells-main front bearing /84,6	1	

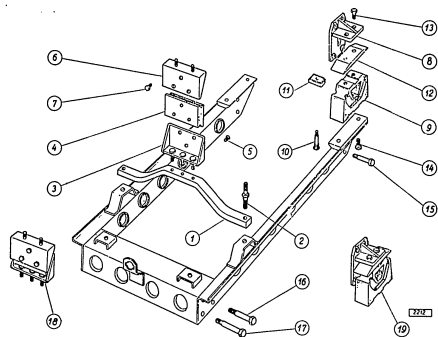
1	2	3	4	5
		undersize / -- Lagerschalenpaar / Vorderlager / ϕ 84,6 Stufe -- Csapagy osz-szeppár / mellő csapagy ϕ 84,6 tuláret	1	
17-3	413.9.01.412	Pair of shells-main front bearing / 84,4 undersize / -- Lagerschalenpaar / Vorderlager / ϕ 84,4 Stufe -- Csapagy osz-szeppár / mellő csapagy ϕ 84,4 tuláret	1	
17-4	413.9.01.512	Pair of shells-main front bearing / 84 undersize / -- Lagerschalenpaar / Vorderlager / ϕ 84 Stufe -- Csapagy osz-szeppár / mellő csapagy ϕ 84 tuláret	1	
17-5	413.9.01.612	Pair of shells-main front bearing / 83,5 undersize / -- Lagerschalenpaar / Vorderlager / ϕ 83,5 Stufe -- Csapagy osz-szeppár / mellő csapagy ϕ 83,5 tuláret	1	
18	413.9.01.105	Bearing cap-ornkcase -- Lagerdeckel zum Kurbelgehäuse / Federgattynhához	3	
19	413.9.01.107	Cap-ornkcase guide bearing -- Lager-deckel zum Kurbelgehäuse / Passlager / Federgattynhához / lesztett csapagy	1	
20	413.9.01.106	Cap-ornkcase front bearing -- Lager-deckel zum Kurbelgehäuse / Vorderlager / Federgattynhához / mellő csapagy	1	

1	2	3	4	5
20a	413.9.01.58	Washer-bearing cap stud -- Bellagscheibe zur Stift-Schraube des Lagerdeckels / Alátét a csapagyfedél ászokosavarjához		10
20b	M16x1.5 MSz 2294	Castellated nut-bearing cap stud -- Blanke Kronmutter zur Stift-Schraube des Lagerdeckels -- Koronás fényes anya a csapagyfedél ászokosavarhoz		10
20c	4x30 MSz 2224	Cotter pin-bearing cap stud -- Splint zum Stift-Schraube des Lagerdeckels -- Szeg a csapagyfedél ászokosavarhoz		10
30	413.1.15.111	Gasket-oil pan -- Dichtung zur Ölwanne / Tömítés az olajteknőhöz		1
31	413.1.15.103	Oil pan -- Ölwanne -- Olajteknő		1
31a	M10 MSz 2210	Lock washer -- Federring -- Rugós alátét		
31b	M10 MSz 2260	Hexagon nut -- Sechskantmutter -- Hat-lapu anyá		22
32	T50 M15-c 325	Plug screw complete-oil pan -- Ölablass-Schraube zur Ölwanne, komplett -- Zá-rócsavar az olajteknőhöz, teljes		1
32a	A36x44 A1 MSz 18716	Sealing ring-oil pan plug screw -- Dichtungerring zur Ablass-Schraube der Öl-		1

1	2	3	4	5
		wanne -- Tömítőgyűrű az olajteknő zá- rócsavarhoz	1	
33	413.9.01.148	Clip-breather pipe -- Klaus zum Entlüf- tungsrohr -- Billina a légzőcsőhöz	1	
34	413.9.01.137	Oil filler pipe complete -- Kompletter Ölnefüllstutzen -- Olajbetöltő tel- jes	1	
35	413.9.01.157	Cap-oil filler pipe -- Kapsz zum Öl- füllstutzen -- Szapka az olajfeltöl- tő toldathoz	1	
36	1A54-7-18	Dipstick -- Ölmeas-Stab -- Olajmív- pálca	1	
36a	270.0.12.35	Sealing ring-dipstick -- Dichtungsring zum Ölmeas-Stab -- Tömítőgyűrű az olajlétszámító példához	1	
37	613.1.01.92	Fan bracket -- Haltebock des Lüfters -- Ventilátor bak	1	
37a	M12 MSz 2210	Lock washer -- Federring -- Rugós a- láék	3	
37b	M12 MSz 2260	Hexagon nut -- Sechskantmutter -- Há- tlapu anya	3	

L-II.

Engine suspension
Motoraufhängung
Motorfeifüggesztés



L-II.

fig. No. / Ábra Sz.	Description / Besenmung / Megnevezés	Pc. St. / Gb.	Remarks / Bemerkung / Megjegyzés	
1	2	3	4	5
ENGINE SUSPENSION -- MOTORAUFHANGUNG				
-- MOTORFELFÜGGESZTÉS				
-	1A73-3100-000	Engine suspension assy. type "Getefo", complete with front and rear support -- Komplette "Getefo" Aufhängung, vordere, hintere, montiert -- "Getefo" felüggesztés, mellés, hátsó, szerelten, komplett	1	
1	A73-3100-005	Front engine support -- Vorderer Motorträger -- Mellés motortartó	1	
2	ZA73-3100-06	Bolt-front engine support -- Schraube zum vorderen Motorträger -- Csavar a mellés motortartóhoz	2	
3	380.9.59.99	Support plate, lower -- Untere Halteplatte -- Tartólemez, alsó	1	
4	380.9.59.101	Insert-front engine mounting -- Einsatz zum vorderen Motorlager -- Mellés mo-	1	

fig. Abb. Abra	No. No. Sz.	Description Benennung Megnevezés	Po. St. db.	Remarks Bemerkung Megjegyzés
1	2	3	4	5
ENGINE SUSPENSION -- MOTORAUFHANGUNG				
-- MOTORFELFÜGGESZTÉS				
-	1A73-3100-000	Engine suspension assy. type "Getefo", completa with front and rear support -- Komplette "Getefo" Aufhängung, vor- dere, hintere, montiert -- "Getefo" fel- függésztes, mellső, hátsó, szerelven, kom- plett	1	
1	1A73-3100-009	Front engine support -- Vorderer Motor- träger -- Mellső motortartó	1	
2	2A73-3100-006	Bolt-front engine support -- Schraube zum vorderen Motorträger -- Csavar a mellső motortartóhoz	2	
3	380.9.59.99	Support plate, lower -- Untere Halteplat- te -- Tartólemez, alsó	1	
4	380.9.59.101	Insert-front engine mounting -- Einsatz zum vorderen Motorlager -- Mellső mo-	1	

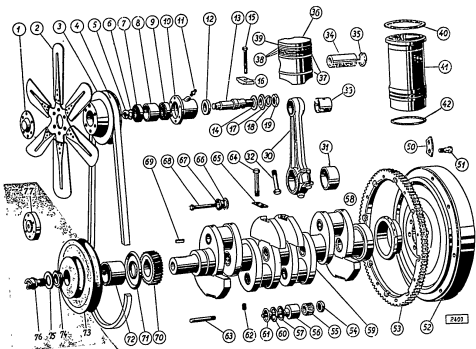
1	2	3	4	5
		torágybetét		
5	A73-3100-005	Countersunk screw -- Senkschraube -- Süllyesztettfejű csavar	3	
6	380.9.59.98	Support plate, upper -- Obere Halte- platte -- Tartólemez, felső	1	
7	M10x15 MSz 2463	Hexagon screw -- Sechskantschraube -- Hátlapfejű tm. f. csavar	3	
7a	M10 Maz 2210	Lock washer -- Federring -- Rugós a- látét	10	
7b	M10 Maz 2260	Hexagon screw -- Sechskantmutter -- Hátlapu f. anya	7	
8	1A54-7-51	Engine support flange, rear -- Hinterer Motorträgeransatz -- Motortartó pe- ren, hátsó	2	
8a	413.9.01.31	Lock plate -- Sicherungsplatte -- Biz- tosító lemez	8	
8b	M12 MSz 2255	Flat nut -- Kleinkantmutter -- Kis- lapátu f. anya	4	
8c	M12x1.5 MSz 2291	Flat nut -- Flachmutter -- Alacsony f. anya	4	
9	380.9.59.118	Insert-rear engine support -- Einsatz	2	

1	2	3	4	5
		zum hinteren Motorträger -- Hátsó mo- torágy betét	2	
10	380.9.59.121	Screw-detent piece -- Schraube zum Kell- lagerstößel -- Csavar az ékgyütök- szőcs	2	
11	380.9.59.119	Rubber damper-engine mountings -- Gummi- keil zum Motorlager -- Gumiék a mo- torágyhoz	2	
12	A73-3100-035	Cover plate-rear engine suspension -- Deckplatte zur hinteren Motoraufhängung -- Fedőlemez a hátsó motorfelüggesz- téshez	2	
13	M14x1.5x30 MSz 2491	Fine-threaded hexagon bolt -- Sechs- kant-schraube mit Feingewinde -- Hat- lapu tm. finommenetű csavar	4	
13a	M14 MSz 2210	Lock washer -- Federring -- Rugós alátét	8	
14	1A73-3100-036	Screw-rear engine mountings -- Schraube zum hinteren Motorlager -- Csavar a hátsó motorágyhoz	4	
15	1A54-7-23/1	Dowel pin -- Pass-Schraube -- Il- lesztett csavar	4	
16	1A54-7-23/1	Dowel pin -- Pass-Schraube -- Il- lesztett csavar	4	

1	2	3	4	5
17	1A54-7-20/1	lesztett csavar Dowel pin -- Pass-Schraube -- Il- lesztett csavar	4	
17a	M4x1,5 MSz 2294	Fine-threaded castellated nut -- Krone - mutter mit Feingewinde -- Finommenetű korunda s. anya	14	
17b	5x30 MSz 2224	Cotter pin -- Splint -- Sasszeg	14	
17c	M4 MSz 2201	Washer -- Beilagscheibe -- Fényes alátét	14	
18	380.9.59.106	Front engine support, type "Getefo" compl. -- Komplettes vorderes Motorlager. Type "Getefo" -- Működő "Getefo" motorág, teljes	1	
19		Rear engine support, type "Getefo" compl. -- Komplettes hinteres Motorlager. Type "Getefo" -- Hátsó "Getefo" motorág, teljes	2	

L-III.

Fan, connecting rod, piston, cylinder liner,
crankshaft
Lüfter, Pleuelstange, Kolben, Zylinderbüchse,
Kurbelwelle
Ventilátor, hajórúd, dugattyú, hengerpersely,
forgattyúengely



L-III.

Fig. No. / Ábra	No. / Sz.	Description / Beműnning / Megnevezés	Pc. / St. / db.	Remarks / Beműkung / Megjegyzés
1	2	3	4	5
FAN , CONNECTING ROD, PISTON, CYLINDER LINER CRANKSHAFT -- LUFER, FLEUELSTANGE, KOLBEN, ZYLINDERBUCHSE, KURBELWELLE -- VENTILATOR, HAJTÓRUD, DUGATYU, HENGERPERSELY, FORGATTUTENGELY				
1	413.9.06.48	Cover disc-fan -- Deckscheibe zum Lüfter Fedőtarcsa a ventilátorhoz	1	
2	413.9.06.62	Fan unit, complete -- Kompletter Lüfter -- Ventilator, teljes	1	
2a	M8 MSz 2210	Lock washer -- Federring -- Rugós alátét	6	
2b	M8x20 MSz 2463	Hexagon bolt -- Sechskantschraube -- Hétszögű im. i. csavar	6	
3	413.9.06.65	Belt pulley-fan -- Riemscheibe zum Lüfter -- Szíjtárcsa a ventilátorhoz	1	
4	20x1320 DIN 2215	V-belt -- Keilriemen -- Ékszíj	1	
5	M18x1.5 DIN 934 70825	Grooved nut-fan -- Nutmutter zum Lüfter -- Horonyanya a ventilátorhoz	1	

1	2	3	4	5
6	180 DIN 70925 67904	Lock plate-fan - Sicherungsbloch zum Lüfter -- Biztosító lemez a ventilátorhoz	1	
7	MSz 787 MSz 787	Ball bearing -- Ringkugellager mit Tiefnuten -- Mélyhornyú gyűrűs golyóscsapágy	1	
8	413.1.06.20	Spacer tube-fan -- Abstandrohr zum Lüfter -- Szártartócső a ventilátorhoz	1	
9	61205.7 MSz 7612	Ball bearing -- Ringkugellager mit Tiefnuten -- Mélyhornyú gyűrűs golyóscsapágy	1	
10	413.9.06.68	Belt pulley hub-fan -- Riemenescheibenabe zum Lüfter -- Szíjtárcsaagy a ventilátorhoz	1	
11	GA-M6x1 MSz 513	Grease nipple with ball lock -- Kugeldruckolajcsap -- Golyós zsírcsap	1	
12	45x31 KN 410-411 45x30x7 KN416	Gasket unit, complete -- Komplette Dichtung -- Teljes, teljes	1	
13	413.1.06.18	Fan shaft -- Lüfterwelle -- Tengely a ventilátorhoz	1	
14	413.1.06.19	Washer-fan shaft -- Scheibe zur Lüfterwelle -- Tárcsa a ventilátor tengelyhez	sz/m	

1	2	3	4	5
14-1	413.1.06.29	Washer-fan shaft -- Scheibe zur Lüfterwelle -- Tárcsa a ventilátor tengelyhez	sz/m	
15	M10x110 MSz 2463	Hexagon bolt -- Sechskantschraube -- Hátlapfejű ts. f. csavar	1	
15a	M10 MSz 2201	Washer -- Beilagscheibe -- Fényes alátét	1	
16	413.9.06.39	Belt tensioner plate -- Riemenspannplátó -- Szíjtartólap	1	
17	413.9.06.44	Shim-fan -- Einbauschleibe zum Lüfter -- Beállítótárcsa a ventilátorhoz	1	
18	M24x5 MSz 2201.2210	Lock washer -- Federring -- Rugós alátét	1	
19	M24x1.5 MSz 2291	Flat nut -- Flachmutter -- Alacsony f. anya	1	
	MSz 416.0.03.00 416.0.03.00	Connecting rod and piston c/w rings, gudgeon pin and cylinder liner -- Komplette Pleuellstange, Pleuelbolzen mit Pleueln, Pleuelbolzen, Pleuelröhren -- Hajtórúd, dugattyú, gyűrűk, dugattyúcsapágysegél, hengervezellő, teljes		
20	sz MSz 413.03/1	Connecting rod c/w cap, shell, bush, bolt, and dowel pin -- Komplette Pleuelstange mit Deckel, samt Lagerschale	4	

1	2	3	4	5
		Büchse, Schrauben und Passtift -- Hajtórúd, fedéllel, csapágycsészével, perszalja, csavarzá, illesztőcsappal, teljes		
30a	213.0.03.03	Connecting rod with cap -- Fleuelstange mit Deckel -- Hajtórúd fedéllel csappal	4	
30b	213.0.03.21	Dowel-pin-connecting rod -- Passtift sur Fleuelstange -- Illesztőcsap a hajtórúdhöz	8	
31	213.0.03.115	Couple of bearing shells -- Lagerschalenspaar -- Csapágycsészepár	4	
31-1	213.0.03.215	Couple of bearing shells I, 74,6 dia -- Lagerschalenspaar I, 74,6 -- Csapágycsészepár I, 74,6	4	
31-2	213.0.03.315	Couple of bearing shells II, 74,6 dia -- Lagerschalenspaar II, 74,6 -- Csapágycsészepár II, 74,6	4	
31a	10301	Dowel-pin-connecting rod -- Passtift sur Fleuelstange -- Illesztőcsap a hajtórúdhöz	4	
32	213.0.03.24	Bolt-connecting rod -- Schraube sur Pleuelstange -- Csavar a hajtórúdhöz	8	

1	2	3	4	5
33	213.0.03.08	Bush-connecting rod -- Büchse sur Pleuelstange -- Perszalja a hajtórúdhöz	4	
34	213.0.03.02	Gudgeon pin -- Kolbenbolzen -- Dugattyúcsapcszeg	4	
35	40x1,75 MSz 231	Circlip -- Seegerring -- Rögzítőgyűrű	8	
-	-	Piston with 112 mm dia rings, gudgeon pin and circlip, complete -- Kompletter Kolben mit Kolbenringen 112 mm, Bolzen und Seegerring -- Dugattyú 112 mm-nyelűvel, csapágygolyó, rögzítőgyűrűvel, teljes	4	
36	414.0.03.25	Piston 112 mm -- Kolben 112 -- Dugattyú 112	4	
36-1	414.0.03.27	Piston I 112,5 mm oversize -- Kolben, Stufe I 112,5 -- Dugattyú I felméret 112,5	4	
36-2	414.0.03.28	Piston II 113 mm oversize -- Kolben, Stufe II 113 -- Dugattyú II felméret 113	4	
37	112/103/6 MSz 5844	Oil scraper ring -- Kolben-Ölring -- Olajátérező dugattyúgyűrű	8	
37-1	112,5/103,5/6 MSz 5844	Oil scraper ring, oversize I -- Kolben-	8	

1	2	3	4	5
		Olíring I Stufe — Olajátteresztő dugattyúgyűrű I felcséret	8	
37-2	112/104/6 MSz 5846	Oil scraper ring, oversize II — Kolben-olíring — Olajátteresztő dugattyúgyűrű	8	
38	112/103/2/3 MA 0,4 MSz 5846	Piston ring — Kolbenring — Dugattyúgyűrű	12	
38-1	112,5/103,5/3 MA 0,4 MSz 5846	Piston ring, oversize I 112,5 mm — Kolbenring I Stufe # 112,5 — Dugattyúgyűrű I felcséret # 112,5	12	
38-2	112/104/3 MA 04 MSz 5846	Piston ring, oversize II 113 mm — Kolbenring II Stufe # 113 — Dugattyúgyűrű II felcséret # 113	12	
39	414.0.03.16	Chromium-plated piston ring, upper, 112 mm — Oberster Kolbenring, verchromt # 112 — Kromozott dugattyúgyűrű felső # 112	4	
39-1	414.0.03.116	Chromium plated piston ring, upper, oversize 112,5 mm — Oberster Kolbenring, verchromt Stufe # 112,5 — Kromozott dugattyúgyűrű felső felcséretes # 112,5	4	
39-2	414.0.03.216	Chromium-plated piston ring, upper, oversize 113 mm — Oberster Kolbenring, verchromt Stufe # 113 — Kromozott dugattyúgyűrű, felső felcséretes # 113	4	

1	2	3	4	5
40	213.004.16	Sealing ring-cylinder liner 1,2 mm — Dichtungsring zur Zylinderbüchse 1,2 mm — Tömítőgyűrű a hengerperselyhez 1,2 mm	sz/sz	
40-1	213.0.04.36	Sealing ring-cylinder liner 0,6 mm — Dichtungsring zur Zylinderbüchse 0,6 mm — Tömítőgyűrű a hengerperselyhez 0,6 mm	sz/sz	
40-2	413.1.04.64	Sealing ring-cylinder liner 0,6 mm — Dichtungsring zur Zylinderbüchse 0,6 mm — Tömítőgyűrű a hengerperselyhez 0,6 mm	sz/sz	
40-3	413.1.04.65	Sealing ring-cylinder liner 1,0 mm — Dichtungsring zur Zylinderbüchse 1,0 mm — Tömítőgyűrű a hengerperselyhez 1,0 mm	sz/sz	
40-4	413.1.04.66	Sealing ring-cylinder liner 1,1 mm — Dichtungsring zur Zylinderbüchse 1,1 mm — Tömítőgyűrű a hengerperselyhez 1,1 mm	sz/sz	
40-5	413.1.04.67	Sealing ring-cylinder liner 1,3 mm — Dichtungsring zur Zylinderbüchse 1,3 mm — Tömítőgyűrű a hengerperselyhez 1,3 mm	sz/sz	
40-6	413.1.04.68	Sealing ring-cylinder liner 1,4 mm — Dichtungsring zur Zylinderbüchse 1,4 mm — Tömítőgyűrű a hengerperselyhez 1,4 mm	sz/sz	
40-7	413.1.04.69	Sealing ring-cylinder liner 1,5 mm — Dichtungsring zur Zylinderbüchse 1,5 mm — Tömítőgyűrű a hengerperselyhez 1,5 mm	sz/sz	

1	2	3	4	5
41	414.0.04.01	Cylinder liner -- Zylinderbűhse -- Hengerpersely	4	
42	213.0.04.17	Rubber sealing ring-cylinder liner -- Gumidűhűtűngerring sur Zylinderbűhse -- Gumi tűműtűgyűrű a hengerperselyhez	8	
50	413.9.02.10	Lock plate-flywheel -- Sicherungsblech sur Schwungrad -- Bűtosűtűtűles a lendkerűkhez	4	
51	413.1.02.37	Fine-threaded bolt-flywheel -- Schraube mit Feingewűnde sur Befestigung des Schwungrades -- Finommenűtű csavar a lendkerűk tűlerűsűtűteshez	8	
52	311.1.1004.00	Flywheel -- Schwungrad -- Lendkerűk	1	
53	413.1.02.39	Starter gear ring -- Anlasserzahnkrans -- Indűtűfűgűskoszoru	1	
55a	M8 MSz 2210	Lock washer -- Federring -- Rűgű-alűtűtű	8	
55b	MSz30 MSz 2461	Hexagon bolt -- Sechseckantschraube sur Zahnkrans -- Hatlapfejű f. oszszű a koszarozas	8	
54	213.0.02.29	Oil seal, complete -- Komplette Abschluss-		

1	2	3	4	5
55	180.0.22.41	Bushes -- Zűrűpersely, teljes Roller cage-clutch shaft -- Kompletter Rollentrans sur Kupplungswelle -- Gűrgűkoszoru, teljes a kapcs. tengelyhez	1	
56	413.9.02.33	Bearing bush with stud -- Lagerbűchse mit Stiftschraube -- Csapűgyűpersely szűkcsavarral	1	
56a	413.1.02.17	Stud with bore for cotter -- Stiftschraube mit Spűtbohrung sur Lagerbűchse -- Asűkűcsavar szűz egűtűrtűttal a cs. perselyhez	1	
56b	413.9.02.07	Bearing bush clutch shaft -- Lagerbűchse sur Kupplungswelle -- Csapűgyűpersely a kapcs. tengelyhez	1	
57	413.1.02.09	Oil seal-bearing bush -- Dűhtűngerring sur Kurbelwelle -- Tűműtűgyűrű a csapűgyűperselyhez	1	
58	413.9.02.43	Oil baffle ring-crankshaft -- Schlen-dűlring sur Kurbelwelle -- Szűrűgyűrű a forg. tengelyhez	1	
59	MSz-413.02/1	Crankshaft assembly counterbalanced -- Kurbelwelle vollsűndűg gewűchtet -- Forgattyutengely, teljes, fűgyűszűlyűzott	1	

1	2	3	4	5
59a	413.9.02.42	Crankshaft -- Kurbelwelle -- Forgattyutengely	1	
59b	413.9.02.26	Balance weight-crankshaft -- Gegengewichte zur Kurbelwelle -- Ellenmuly a forgattyutengelyhez	4	
60	B38x44 A1 MSz 18716	Sealing ring-lock cap -- Dichtungering sum Verschlussdeckel -- Tömítógyűrű a zárófedélhez	8	
61	413.9.02.05	End cap-main journal -- Verschlussdeckel zur Kurbelwelle -- Zárófedél a forgattyutengelyhez	8	
62	M10x10 DIN 591	Grub screw-crankshaft -- Gewindestift zur Kurbelwelle -- Hornycsavar a forgattyutengelyhez	16	
63	413.1.02.16	Stud-end cap -- Stiftschraube sum Verschlussdeckel -- Ásokosavar a zárófedélhez	1	
64	413.9.02.03	Screw-balance weight -- Schraube sum Gegengewicht -- Csavar az ellenmulyhoz	8	
65	413.9.02.04	Lock plate-balance weight -- Sicherungsblech sum Gegengewicht -- Biztosítólemez az ellenmulyhoz	4	
66	B32x36A/ MSz 18716	Sealing ring-end cap -- Dichtungering	8	

1	2	3	4	5
		zum Verschlussdeckel -- Tömítógyűrű a zárófedélhez	8	
67	413.9.02.06	End cap-crankshaft -- Verschlussdeckel zur Kurbelwelle -- Zárófedél a forgattyutengelyhez	8	
68	M8x85/ MSz 2664	Hexagon bolt-end cap -- Sechskantschraube sum Verschlussdeckel -- Hatlapfejű f.csavar	7	
68a	M8 MSz 2265	Flat castellated nut -- Flache Kronenmutter -- Alacsony koronás f.any	9	
68c	B8 x 12 A1 MSz 18716	Sealing ring-crankshaft end cap -- Dichtungering sum Verschlussdeckel der Kurbelwelle -- Tömítógyűrű a forgattyutengelyzáró fedélhez	16	
68d	M8 MSz 2201 MSz 2201	Washer-crankshaft end cap -- Unterlagscheibe zum Verschlussdeckel -- Pártyes alátét a forg.tengelyzáró fedélhez	16	
69	10x8x28 MSz 2306	Recessed key-camshaft driving gear -- Rundstirnige Passfedern zum Steuerungs-Antriebsrad -- Fészeskes reteszses vezér- mű hajtófogaskerékhez	1	
70	413.9.02.27	Camshaft driving gear -- Steuerungs-Antriebsrad /Kurbelwellenrad/ -- Vezér-	1	

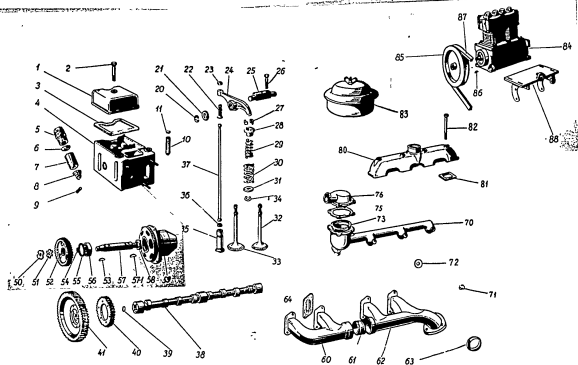
1	2	3	4	5
		műhajtó fogaskerék		
71	413.9.02.12	Oil baffle ring-crankshaft -- Öl-schleuderring zur Kurbelwelle -- Szűrő-gyűrű a forgattyúsíngolyóhoz	1	
72	413.9.02.22	Belt pulley hub -- Riemenscheibennabe -- Szijtárcsaagy	1	
73	413.9.02.22 3/4.2-1033-002	Belt pulley complete-crankshaft -- Komplett Riemenscheibe zur Kurbelwelle -- Szijtárcsa a forg. tengelyhez, teljes csavarhoz	1	
73a	8x16 MSz 2218	Dowel pin -- Pasztift -- Illesztőcsiga	1	
74	413.9.02.18 3/4.2-1033-007	Washer-crankshaft fixing screw -- Unterlagenscheibe zur Arretierschraube der Kurbelwelle -- Alátét a forgatógiztő csavarhoz	1	
75	413.9.02.18	Lock plate-crank dog -- Sicherungsblech zur Andrehklaue -- Biztonsítólémez a kézi indítókorához	1	
76	413.9.02.18 3/4.2-1033-007	Crank dog -- Andrehklaue -- Kézi indító koró	1	
77	3/4.2-1033-031	Spacer -- Zwischenscheibe -- Tüvtartó alátét		

L-IV.

Cylinder head, Camshaft, Compressor and fuel injection pump drive, Exhaust manifold, Water pipe system, Air cleaner

Zylinderkopf, Nockenwelle, Luftkompressor und Einspritzpumpenantrieb, Auspuffkrümmer, Wasserablaufrohr und Ölbadluftfilter

Hengerfej, bűtyköstengely, légsűrítő- és befecskendező szivattyúhajtás, kipuffogó, vízcső levegőszűrő



L-IV.

Fig. No. / Abbr.	No. / Sz.	Description / Benennung / Megnevezés	Qt. / St.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
CYLINDER HEAD, CAMSHAFT, COMPRESSOR AND FUEL INJECTION PUMP DRIVE, EXHAUST MANIFOLD, WATER PUMP SYSTEM, AIR CLEANER ZYLINDERKOPF, Nockenwelle, Luftpumpen- und Einspritzpumpenantrieb, Auspuff- und Wasserpumpenlaufwerk, Luftfilter Hengerfej, Bűtyköstengely, Lésurító és befecskendő szivattyú-hajtás, kipufogó, vízcső levegőszűrő				
1	413.9.04.07	Cylinder head cover -- Zylinderkopfdeckel -- Hengerfedél	4	
2	M10x50 MSz 2461	Hexagon bolt-cylinder head cover -- Sechszögletes csavar a hengerfej fedélhez	4	
2a	M10 MSz 2201	Washer-hexagon bolt -- Unterlagscheibe zur Sechseckschraube -- Fényes alátét a hatlécű csavarhoz	4	

1	2	3	4	5
5	415.9.04.12	Gasket-cylinder head cover -- Dichtung zum Zylinderkopfdeckel -- Tömítés a hengervej fedélhez	4	
-	ESz 413.D.04	Cylinder head with valves, spout burner and studs -- Zylinderkopf mit Ventilen, Maulbrenner und Stiftschrauben -- Hengervej szelepekkel, szájjas égvel és ászokcsavarokkal	4	
4	413.1.04.44	Cylinder head o/w with studs -- Kompletter Zylinderkopf mit Stiftschrauben -- Hengervej, ászokcsavarokkal, feljese	4	
4a	413.0.04.01	Cylinder head -- Zylinderkopf -- Hengervej	4	
4b	M10x70 MSz 2402	Stud-water outlet manifold -- Stiftschraube zum Wasserablaufrohr -- Ászokcsavar a vizleeresztő csőhöz	4	
4c	M10x70 MSz 2402	Stud-exhaust manifold -- Stiftschraube zum Auspuffkammer -- Ászokcsavar a kipufogócsőhöz	8	
4d	213.0.01.68	Washer-cylinder head stud -- Unterlegscheibe zur Zylinderkopfschraube -- Alátét a hengervejcsavarhoz	16	
4e	213.0.01.54	Hexagon nut-cylinder head stud -- Sechskantmutter zur Zylinderkopfschraube -- Hatlapú anya a hengervejcsavarhoz	16	

1	2	3	4	5
4f	413.1.04.09	Dowel pin -- Zylinderstift zum Deckel -- Illesztőszeg a fedélhez	8	
5	213.0.04.29	Threaded bush -- Gewindebüchse -- Menetes persely	4	
6	213.0.04.28	Sealing ring-threaded bush -- Dichtungsring zur Gewindebüchse -- Tömítő gyűrű a menetes perselyhez	4	
7	213.0.04.27	Precombustion chamber -- Vorkammer -- Előkamra	4	
8	213.0.04.79	Spout burner -- Maulbrenner -- Szájjas égő	4	
9	5x14 MSz 2219	Rivet pin-spout burner -- Nietstift zur Befestigung des Maulbrenners -- Szegőcseszeg a szájjas égő rögzítéséhez	4	
10	213.0.04.72	Valve guide -- Ventilführungshülse -- Szeleprezető hüvely	8	
11	213.0.04.12	Circulip-valve guide -- Sicherungerring zur Ventilführungshülse -- Rögzítő gyűrű a szeleprezető hüvelyhez	8	
20	19x1.2 MSz 2232	Circulip-rodker -- Sicherungerring zum Kipphebel -- Rögzítőgyűrű a szelephélsőhöz	8	
21	213.0.05.31	Washer -- Federring zum Kipphebel	8	

1	2	3	4	5
22	413.9.05.14	Valve adjusting screw -- Ventilkeinstellschraube -- Szelepbéállító csavar	8	
23	213.0.05.65	Hexagon nut-valve adjusting screw -- Sechskantmutter sur Ventilkeinstellschraube -- Hatlapu anya a szelepbéállító csavarnak	8	
24	ESs-413.05/4a	Rocker with bush -- Kipphebel mit Buchse -- Szelephimba pereszelyei	8	413.9.05.35 413.9.05.24a
24a	413.9.05.35	Rocker -- Kipphebel -- Szelephimba	8	
24b	413.9.05.24a	Bush-rocker -- Buchse zum Kipphebel -- Pereszely a szelephimbához	4	
25	213.0.05.25	Rocker shaft -- Ventilschwingehebelwelle -- Szelephimbatengely	4	
26	M10x40 MSs 2461	Hexagon stud-rocker shaft -- Sechskantschraube sur Ventilschwingehebelwelle -- Hatlapos fejű csavar a szelephimba tengelyhez	8	
26a	M10 MSs 2210	Lock washer-rocker shaft -- Federring sur Ventilschwingehebelwelle -- Rugós alátét a szelephimba tengelyhez	8	
27	213.0.05.43	Conical valve cotter -- Ventilkegelstift -- Kúpos darab a szelephézb	16	

1	2	3	4	5
28	213.0.05.42	Valve spring retainer, upper -- Ventilfederhalter, oberer -- Szeleprugó felső tágyér	8	
29	413.9.05.30	Inner valve spring -- Innere Ventilfeder -- Szeleprugó, belső	8	
30	413.9.05.29	Outer valve spring -- Aussere Ventilfeder -- Szeleprugó, külső	8	
31	213.0.05.112	Valve spring retainer, lower -- Ventilfederhalter, unterer -- Szeleprugó alsótágyér	8	
32	413.1.05.39	Exhaust valve -- Ablassventil -- Kikapó szelep	4	
33	413.1.05.40	Inlet valve -- Einlassventil -- Szívószelep	4	
34	413.1.05.100	Valve seat ring -- Ventilabdichtungerring -- Szelepbiztosító gyűrű	8	
35	ESs-413.05/2	Tappet with insert / pushrod, complete / Kompletter Ventiltrieb mit Einsteckbolzen / szelepbiztosító talp betét / szelepbiztosító talp	8	413.9.05.52 413.9.05.06
36a	413.9.05.52	Tappet -- Ventiltrieb -- Szelepbiztosító talp	8	
36	413.9.05.06	Tappet -- Ventiltrieb -- Szelepbiztosító talp	8	

1	2	3	4	5
37	413.9.05.09	Pushrod, complete -- Komplette Stosstan- ge -- Tolórud, teljes	8	
38	413.9.05.16	Camshaft -- Nockenwelle -- Büttyös- tengely		
38a	6x16 MSz 2246	Dowel pin-camshaft wheel -- Passtift zum Nockenwellenrad -- illesztőcsig a Büttyöstengely kerékhez	1	
39	413.9.05.33	Disc-camshaft -- Scheibe zur Nockenwel- le -- Tárcsa a Büttyöstengelyhez	1	
40	415.9.05.19	Intermediate gear -- Zwischenrad zum Kompressor und zur Einspritzpumpe -- Közöségi kerék a légszűrő és befec- kentő szivattyúhoz	1	
41	413.9.05.18	Timing gear -- Nockenwellenantriebsrad -- Veszérműhajtókerék	1	
41a	413.1.03.04	Hexagon bolt-timing gear -- Sechseck- schraube zum Nockenwellenantriebsrad -- Hatlapfejű csavar a veszérműhajtóke- rékhez	10	
41b	413.1.05.05	Lock plate I-timing gear -- Sicherungs- blech I zum Nockenwellenantriebsrad -- Biztosítólemez I a veszérműhajtóke- rékhez	2	
41c	413.1.05.07	Lock plate II-timing gear -- Si -	2	

1	2	3	4	5
		cherungsblech II zum Nockenwellenan- triebsrad -- Biztosítólemez II a ve- szérműhajtókerékhez	2	
41d	413.1.05.08	Lock plate III-timing gear -- Si- cherungsblech III zum Nockenwellenan- triebsrad -- Biztosítólemez III a veszérműhajtókerékhez	1	
50	413.9.13.18	Grooved nut -- Nutmutter -- Hornyos anya	1	
51	413.9.13.19	Lock nut -- Sicherungsblech -- Biz- tosító lemez	1	
52	413.9.13.17	Gear-fuel injection pump and compressor drive -- Zahorád zum Antrieb der Ein- spritzpumpe und des Kompressors -- Fogaskerék a befecskendezőszivattyú és a légszűrő hajtáshoz	1	
53	5x6,5 MSz 311	Woodruff key -- Scheibenfeder -- Ives retesz	1	

1	2	3	4	5
54	25x1,2 MSZ 232	Circclip -- Seeperring -- R8/x11,02, 6x4	4	
55	52x2 MSZ 231	Circclip -- Seeperring -- R8/x11,02, 6x4	2	
56	6205 MSZ 7612	Ball bearing -- Rugellator -- Golyócsapó	2	
57	413.9.12.20	Driving shaft -- Antriebswelle -- Hajtó- tengely	1	
57-1	4x6,5 MSZ 311	Woodruff key -- Scheibenfelér -- Ives retesz	1	
58	8/7x1p0 M: 408	Gasket, assembly -- Dichtung, vollständig -- Tömítés, teljes	1	
59	413.9.12.16	Injection pump drive - housing -- Gehäuse zum Einspritzpumpe - Antrieb -- Ház a befecskendezési vevőnyu hájtásához	1	

1	2	3	4	5
57				1
60	413.9.11.14	Exhaust-manifold-half -- Auspuffkrümmer hälfte -- Kipufogósícsőfél		1
61	413.9.11.15	Spacer sleeve-exhaust manifold -- Zwi- schenbüchse zum Auspuffkrümmer -- Be- tétpersely a kipufogósícsőhöz		1
61a	64/59/2,5 YA 0,8 MSz 5846	Piston ring -- Kolbenring -- Dugattyú gyűrű		4
62	1A54-33-2	Flanged exhaust manifold-half -- Aus- puffkrümmerhälfte mit Flansch -- Fe- rreze Kipufogósícső		1
63	413.9.11.09	Bulged washer-exhaust manifold -- Dicht- line zum Auspuffkrümmer -- Tömítő lencse a kipufogósícsőhöz		1
64	413.9.11.21	Gasket-exhaust manifold -- Dichtung zum Auspuffkrümmer -- Tömítés a kipufo- gósícsőhöz		4
64a	M10 MSz 2210	Lock washer -- Federring -- Rugós a- látét		11
64b	M10 MSz 2260	Hexagon nut-exhaust flange -- Sechs- kantmutter zum Auspuff-Flansch -- Hatlapú anyu a kipufogó peremhez		11

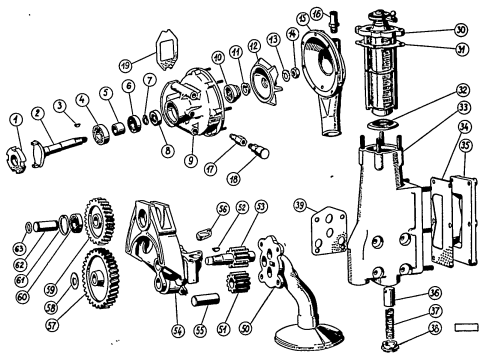
1	2	3	4	5
64c	M10x45 MSz 2461	Hexagon bolt-exhaust flange -- Sechs-Kantschraube zum Auspuff-Flansch -- Hatlapu f. csavar a kipufogó peremhez	3	
70	413.1.04.14	Water outlet manifold -- Wasserrohr -- Vízcső	1	
70-1	413.9.04.06	Water outlet manifold to engines without thermostat -- Wasserrohr zum Motor ohne Thermostat -- Vízcső thermostat nélkül motorhoz	1	
70a	M14x18 A1 MSz 18716	Sealing ring -- Dichtungering -- Tömítőgyűrű	1	
70b	M14x18 MSz 708072 A	Threaded plug -- Verschlusspropfen mit Gekinde -- Menetes zárdugó	1	only for engines without thermostat Nur zum Motor ohne Thermostat -- Csak thermostat nélkül motorhoz
71	M10 MSz 2279	Cap nut-water outlet manifold -- Hutmutter zum Wasserrohr -- Magas zárt anya vízcsőhöz	4	
71a	A 10x16 MSz 18716	Sealing ring -- Dichtungering -- Tömítőgyűrű a vízcsőhöz	4	
72	213.0.04.13	Sealing ring-water outlet manifold -- Dichtungering zum Wasserrohr -- Tömítőgyűrű a vízcsőhöz	4	

1	2	3	4	5
73	413.9.04.27	Gasket-thermostat -- Dichtung zum Thermostat -- Tömítés a thermostatához	1	
75	413.9.04.16	Gasket-cover -- Dichtung zum Abschlussdeckel -- Tömítés a fedélhez	1	
76	413.9.04.15	Cover-water manifold -- Abschlussdeckel zum Wasserrohr -- Fedél a vízcsőhöz	1	
76a	M6x28 MSz 2461	Hexagon bolt -- Sechskantschraube -- Hatlapfejű f. csavar	4	
76b	M6 MSz 2210	Lock washer -- Federring -- Rugós alátét	4	
80	413.1.11.29	Intake manifold -- Saugrohr -- Szívőcső	1	
81	213.0.11.05	Gasket-intake manifold -- Dichtung zum Saugrohr -- Tömítés a szívócsőhöz	4	
82	M10x150 MSz 2461	Hexagon screw-intake manifold -- Sechskantschraube zum Saugrohr -- Hatlapfejű f. csavar a szívócsőhöz	4	
82a	M10 MSz 2201	Washer-intake manifold -- Unterlagscheibe zum Saugrohr -- Fényes alátét a szívócsőhöz	4	
83	413.B.19.100	Oil bath air cleaner with central	1	

1	2	3	4	5
		fixing bolt complete -- Kompletter Ölbadluftfilter mit Durchgangs-schraube -- Kőépen, csavarral rögzített olajfürő levegőszűrő, komplett.		
84	L2-o.o	Two-cylinder air compressor -- Zwei - Zylinder Luftpressor -- Kőthengeres légszűrő	1	
85	311:2-1033-026	V- belt pulley -- Keilriemenscheibe -- Szíjtárcsa	1	
86	5x7,5 DIN 504	Woodruff key -- Scheibenfeder -- Ives retesz	1	
87	17:11:1200 40 KMSZ 11007	V- belt -- Keilriemen -- Ékszíj	1	
88	311:2-1033-011	Support-air compressor, assembly -- Halter zum Luftpressor, vollständig -- Légszűrőtartó teljes.	1	

L-V.

Water pump, Oil filter, Oil pump
Wasserpumpe, Ölfilter, Ölpumpe
Vízszivattyú, olajszűrő, olajszivattyú



L-V.

Fig. Abb.	No. No.	Description Benennung Megnevezés	Pc. St. db.	Remarks Bemerkungen Megjegyzések
1	2	3	4	5
WATER PUMP, OIL FILTER, OIL PUMP -- WASSERPUMPE, ÖLFILTER, ÖLPUMPE -- VÍZSZIVATTYÚ, OLÁJSZÜRŐ, OLÁJSZIVATTYÚ				
1	412.9.06.99	Coupling disc-water pump -- Kupplungs- scheibe zur Wasserpumpe -- Kácsoló- lecsa a vízzivattyúhoz	1	
2	413.1.06.181	Water pump shaft -- Wasserpumpenwel- le -- Vízzivattyú tengely	1	
3	3x5 MSz 311	Woodruff key -- Scheibenfeder -- Ives retesz	1	
4	612032 MSz 7612	Radial single-row ball bearing -- Ring- kugellager mit tiefer Nut -- Mély- hornyu gyűrűs golyóscsapágy	1	17x40x12
5	412.1.06.153	Spacer sleeve -- Abstandshülse -- Tá- hüvely	1	
6	61202 MSz 7612	Radial single-row ball bearing -- Ring- kugellager mit tiefer Nut -- Mély- hornyu gyűrűs golyóscsapágy	1	15x35x11

1	2	3	4	5
7	15x1 MSz232 MSz 7897	Ring fastener -- Befestigungsring -- Rögzítőgyűrű	1	
8	15x30x10 MSz 7897	Lip type oil seal -- Stulpliederring -- Karmanlyuk tömítőgyűrű	1	
9	413.1.06.143 M6x18	Water pump housing -- Wasserpumpenge- häuse -- Vízszivattyúház	1	
9a	MSz 2402	Stud -- Stiftschraube -- Ászokosa- vár	5	
9b	M6 MSz 2210	Lock washer -- Federring -- Rugós a- láték	7	
9c	M6 MSz 2260	Hexagon nut -- Nut -- Hatlapu f.anya	7	
9d	M6x30 MSz2402	Stud -- Stiftschraube -- Ászokosa- vár	2	
10	213.0.06.92	Gasket /type Diring/ -- Dichtung /DI- ringdichtung/ -- Tömítés /diring- tömítés	1	
11	213.0.06.55	Busb-water pump housing -- Buchse - zum Wasserpumpengehäuse -- Felső a vízszivattyúházhoz	1	
12	413.1.06.182	Impeller -- Wasserpumpen-Schaufelrad -- Vízszivattyú lapátkerék	1	

1	2	3	4	5
13	413.9.06.95	Lock plate -- Sicherungsblech -- Biz- tosító tárcsa	1	
14	413.1.06.163	Hexagon nut -- Sechskantmutter -- hat- lapu f.anya	1	
15	413.1.06.165	Water pump cover -- Deckel zur Wasser- pumpe -- Fedél a vízszivattyúhoz	1	
15a	M4x18 M MSz 18716	Sealing ring -- Dichtungsring -- Töm- ítőgyűrű	1	
15b	M4x1,5 MSz 70802	Threaded plug -- Abschlusspfropfen mit Gewinde -- Menetes záródugó	1	Only for engine without thermostat Nur zum Motor ohne Thermo- stat -- Csak thermosztatná- küllő motorhoz
16	413.1.06.166	Adapter to the water pump -- Verbindung- stück zur Wasserpumpe -- Csatlakozó darab a vízszivattyúhoz	1	
17	413.1.06.156	Setcrew-water pump -- Befestigungs- schraube zur Wasserpumpe -- Rögz- ítőcsavar a vízszivattyúhoz	1	
18	1 MSz 573	Grease cup -- Schmierbüchse -- Zsír- sószelece	1	
19	413.1.06.254	Gasket-water pump -- Dichtung zur Was- serpumpe -- Tömítés vízszivattyúhoz	1	

1	2	3	4	5
19a	M10 MSz 2210	Lock washer -- Federring -- Rugós alátét	2	
19b	M10 MSz 2260	Hexagon nut -- Sechskantmutter -- Hatlapu f.anya	2	
-	ESz. 413.07/2	Oil filter, complete -- Kompletter Ölfilter -- Olajsűrő, teljes	1	
30	413.9.07.25	Filter element -- Ölfiltereinsatz -- Olajsűrő betét	1	
30a	M6 MSz 2210	Lock washer-filter fastening -- Federring zur Befestigung des Filters -- Rugós alátét a sűrő megerősítéshez	4	
30b	M6 MSz 2255	Hexagon nut-filter element -- Nut zum Ölfiltereinsatz -- Hatlapu f.anya az olajsűrő betéthez	4	
31	270.0.17.12	Gasket-filter element -- Dichtung zum Ölfiltereinsatz -- Tömítés az olajsűrőbetéthez	1	
32	413.9.07.49	Screen-filter element -- Schirm zum Ölfiltereinsatz -- Ellenő az olajsűrőbetéthez	1	
33	413.9.07.42	Oil filter housing -- Ölfiltergehäuse -- Olajsűrőház	1	

1	2	3	4	5
33h	M6x20 MSz 2404	Stud-oil filter housing -- Stiftschraube zum Ölfiltergehäuse -- Ászokcsavar az olajsűrőházhoz	6	
34	413.9.07.24	Gasket-side cover of oil filter housing -- Dichtung zum Seitendeckel des Ölfiltergehäuses -- Tömítés az olajsűrőház oldalról fedélhez	1	
35	413.9.07.23	Side cover-oil filter housing -- Seitendeckel des Ölfiltergehäuses -- Oldalsó fedél az olajsűrőházhoz	1	
35a	M8 MSz 2210	Lock washer -- Federring -- Rugós alátét	10	
35b	M8 MSz 2260	Hexagon nut-cover -- Nut zum Deckel -- Hatlapu f.anya fedélhez	6	
35c	MSz M8x9072461MSz	Hexagon bolt-oil filter housing -- Sechskantschraube zum Ölfiltergehäuse -- Hatlapfejű f.csavar az olajsűrőházhoz	4	
35d	M8 MSz 2200	Washer -- Unterlagscheibe -- Nyers alátét	4	
36	413.9.07.18	Piston-oil filter -- Kolben zum Ölfiltergehäuse -- Dugattyú az olajsűrőházhoz	2	
37	413.9.07.59	Spring-oil filter housing -- Feder zum Ölfiltergehäuse -- Olajsűrőházhoz rugó	2	

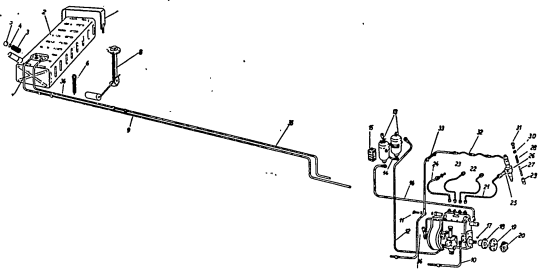
1	2	3	4	5
38	413.9.07.19	Plug-oil filter housing -- Verschluss-schraube zum Ölfiltergehäuse -- Zárócsavar az olajszűrőházhoz	3	
38a	MSz 18716	Sealing ring-plug -- Dichtungsring zur Verschluss-Schraube -- Tömítőgyűrű a zárócsavarhoz	3	
39	413.9.07.20	Side gasket-oil filter housing -- Seitliche Dichtung des Ölfiltergehäuses -- Oldalsó tömítés az olajszűrőházhoz	1	
	ESz, 413.07/1	Oil pump, complete -- Komplette Ölpumpe -- Olajszivattyú, teljes	1	
50	413.9.07.71	Cover assy-oil filter housing -- Kompletter Abschlussdeckel zum Ölpumpengehäuse -- Fedél olajszivattyúházhoz, telj.	1	
50a	MSz 20 MSz 2463	Hexagon bolt-cover -- Sechskantschraube zum Deckel -- Hatlapú ta.f.osavar fedélhez	4	
50b	MS MSz 2210	Lock washer-cover -- Federring zum Deckel -- Rugós alátét fedélhez	4	
51	413.1.07.35	Gear-oil pump -- Ölpumpen Zahnrad -- Olajszivattyú fogaskerék	2	
52	4x5 DIN 6888	Woodruff key - oil pump shaft -- Scheibfeder zur Ölpumpenwelle -- Ives retesz az olajszivó tengelyhez	1	

1	2	3	4	5
53	413.1.07.32	Oil pump driving gear, complete -- Kompletten Ölpumpen-Zahnrad -- Olajszivattyú meghajtó fogaskerék, teljes	1	
53a	413.1.07.34	Shaft-oil pump gear -- Welle zum Öl-pumpen-Zahnrad -- Tengely az olajszivattyú fogaskerékhez	1	
54	413.9.07.45	Oil pump housing -- Ölpumpengehäuse -- Olajszivattyúház	1	
55	413.1.07.31	Shaft-oil pump idler gear -- Welle zum losen Rad der Ölpumpe -- Tengely az olajszivattyú hajtott kerekéhez	1	
56	413.1.01.57	Gasket 0,3 mm-oil pump housing -- Dichtung zum Ölpumpengehäuse 0,3 mm -- Tömítés az olajszivattyúházhoz 0,3 mm	sz/sz	
56-1	413.1.01.58	Gasket, 0,5 mm-oil pump housing -- Dichtung zum Ölpumpengehäuse 0,5 mm -- Tömítés az olajszivattyúházhoz 0,5 mm	sz/sz	
56-2	413.1.01.59	Gasket, 0,8 mm-oil pump housing -- Dichtung zum Ölpumpengehäuse 0,8 mm -- Tömítés az olajszivattyúházhoz 0,8 mm	sz/sz	
57	413.9.07.05	Driving gear-oil pump -- Antriebszahnrad zur Ölpumpe -- Meghajtó fogaskerék az olajszivattyúhoz	1	
58	14 KN683	Lock plate -- Sicherungsblech -- Biz-	1	

1	2	3	4	5
58a	114xl.5 MSs 2251	tosító aldtét Flat nut-shaft -- Flachmutter zur Welle -- Alacsony f.anya a tengelyhez	1	
59	413.9.07.66	Intermediate gear-oil pump -- Zwischenrad sur Öl-pumpe -- Közbeneskerék az olajszivattyúhoz	1	
60	61202 MSs 7612	Radial single-row ball bearing-oil pump -- Kugellager mit tiefer Abkühlung sur Öl-pumpe -- Melyhorvú golyós-csapágy az olajszivattyúhoz	2	
61	35xl.5 MSs 231	Circulip-oil pump -- Seegering sur Öl-pumpe -- Rögstőgyűrű az olajszivattyúhoz	2	
62	413.9.07.65	Shaft-intermediate gear -- Welle zum Zwischenrad -- Tengely a közbenes kerékhez	1	
63	14xl MSs 232	Circulip-intermediate gear -- Seeger-ring zum Zwischenrad -- Rögstőgyűrű a közbenes kerékhez	2	

L-VI.

Fuel tank, Fuel pipes, Nozzle holder
Kraftstoffbehälter, Kraftstoffleitung, Einspritzpumpe, Düsenhalter
Tüzelőanyagtaridó, vezeték, befecskendező szivattyú, fúvókatarló



I-VI

Fig. Abb. Avra.	No. No. Sz.	Description Benennung Magyaroszás	Fc. St. Gb.	Remarks Bemerkung Megjegyzés
1	2	3	4	5
FUEL TANK, FUEL PIPES, INJECTION PUMP, NOZZLE HOLDER -- KRAFTSTOFFBEHÄLTZER KRAFTSTOFFLEITUNG, EINSPRITZPUMPE, DÜSENHALTER -- TÜZELŐANYAGTARTÁLY, VEZETÉK, BEFECSEKENDŐ SZIVATTYÚ, FÜVŐKATARNÓ				
1	3LL.1-1501-004	Support frame complete-fuel tank -- Kompletter Befestigungsrahmen zum Kraftstoffbehälter -- Tüzelőanyagtartály felordatókeret, teljes	2	
1a	M12x1.5x60 MSz 2450	Hexagon screw /bolt/ -- Sechskanteschraube mit Feingewinde -- Hatlapfejű finommenetű csavar	2	
1b	M12x15 MSz 2290	Hexagon nut -- Sechskantemutter mit Feingewinde -- Hatlapfejű finommenetű anya	6	
1c	M12 MSz 2210	Lock washer -- Federring -- Rugós alátét	4	
2	3LL.1-1502-000	Fuel tank -- Kraftstoffbehälter -- Tüzelőanyagtartály	1	

1	2	3	4	5
3	350.1.55.50	Fuel strainer -- Einfüllfilter -- Be- Öntőszűrő	1	
4	220.0.55.15	Sealing ring -- Dichtungering -- Tö- mitőgyűrű	1	
5	380.9.55.32	Filler cap -- Verschlusskappe -- Záró sapka	1	
6		Strainer Assy -- Komplettes Filter -- Szűrő, teljes	1	
7		Suction pipe Assy -- Komplettes Saug- rohr -- Szívócső, teljes	1	
7a	11 16x24 #2 MSs 18716	Sealing ring -- Dichtungering -- Tö- mitőgyűrű	1	
8	RF 30	Float /without fuel level gauge/ -- Schwimmer ohne Kraftstoff-Standzeiger -- Üszőkészülék tüzelőanyagállás- tató nélkül	1	
8a	M5 MSs 2210	Lock washer -- Federring -- Rugós alátét	5	
8b	M5x15 MSs 2450	Screw, half-round head -- Flachrund- schraube -- Félgömbfejű f csavar	5	
9	31L.1-1504- 012	Fuel pipe Assy from 1st to 2nd connect- ing hose -- Komplette Kraftstoff -	1	

1	2	3	4	5
		letung zwischen I. und II. Verbindungs- schlauch -- Tüzelőanyagvezeték az I. csatlakozó tömlőtől a II. csatlakozó tömlőig, teljes		
9a	6 9/ 17x25	Rubber hose -- Gummischlauch -- Gum- tömlő	4	
9b	9MSs 18714	Hose clamp -- Schlauchbinder mit Splint -- Saaszeges tömlőbillincs szár	8	
9c	9x0.4ASz1 MSs 4215	Steel band -- Stahlband -- Acélsza- lág	8	
10	31L.1-1504- 021	Fuel pipe Assy from the 2nd connecting hose to fuel pump -- Kompl. Kraft- stoffleitung zwischen II. Verbindungs- schlauch und Kraftstoffpumpe -- Tü- zelőanyagvezeték a II. csatlakozó töm- lőtől a tápszivattyúig, teljes	1	
11	1A54-16-3	Hollow screw -- Hohlchraube -- Üre- ges csavar	2	
11a	A14x18 DIN 7603	Sealing ring -- Dichtungering -- Tö- mitőgyűrű	4	
12	31L.1-1504- 026 300-9-55-30	Fuel pipe Assy from fuel pump to fine filter I. -- Komplette Kraftstoff- leitung zwischen Förderpumpe und I. Feinfilter -- Tüzelőanyagvezeték a	1	

1	2	3	4	5
13	380.9.55.00 MOM MB-51	Fuel filter assy -- Komplettes Kraftstoff-Filter -- Tüzelőanyagszűrő, teljes	2	
14	31L.1-1504-031	Fuel pipe assy from fine filter I. to fine filter II. -- Kraftstoffleitung zwischen Feinfilter I. und II. -- Tüzelőanyagvezeték a finomszűrő I.-től a finomszűrő II.-ig	1	
15	FL.DIN 73358	Filter element -- Filtereinsatz -- Szűrőbetét	2	
16	31L.1-1504-035	Fuel pipe assy from fine filter to injection pump -- Komplette Kraftstoffleitung zwischen Feinfilter und Einspritzpumpe -- Tüzelőanyagvezeték, teljes, a finomszűrőtől a befecskendező szivattyúig	1	
17	4x6,5 DIN 304	Woodruff key -- Scheibenfeder -- Ives retesz	1	
18	413.9.18.29	Coupling dog half -- Klauenkupplungshälfte -- Körömös kapcsolótárcsa	1	
19	413.9.18.114	Coupling disc -- Kupplungsscheibe geschlossen -- Kapcsolótárcsa - szár	1	

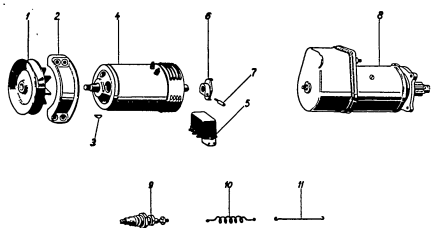
1	2	3	4	5
20	413.9.18.111	Coupling dog assy, adjustable -- Komplette Klauenkupplungshälfte -- Állítható körömös kapcsolótárcsa, teljes	1	
21	413.9.08.07	Fuel pipe assy to 1st cylinder -- Komplettes Kraftstoff-Leitungsrohr zum I. Zylinder -- Tüzelőanyagvezetődugasz I. hengerekhez, teljes	1	
22	413.9.08.08	Fuel pipe assy to 2nd cylinder -- Komplettes Kraftstoff-Leitungsrohr zum II. Zylinder -- Tüzelőanyagvezetődugasz II. hengerekhez, teljes	1	
23	413.9.08.11	Fuel pipe assy to 3rd cylinder -- Komplettes Kraftstoff-Leitungsrohr zum III. Zylinder -- Tüzelőanyagvezetődugasz III. hengerekhez, teljes	1	
24	413.9.08.13	Fuel pipe assy to the 4th cylinder -- Komplettes Kraftstoff-Leitungsrohr zum IV. Zylinder -- Tüzelőanyagvezetődugasz IV. hengerekhez, teljes	1	
25	413.9.08.118a	Filter body -- Filtergehäuse -- Szűrőház	4	
25a	413.9.08.119a	Stem, filter element -- Filterstab -- Tömítés a szűrőházhoz		
25b	413.9.08.122a	Sealing-filter body -- Dichtung zum Filtergehäuse -- Tömítés a szűrőházhoz	4	

1	2	3	4	5
26	413.1.08.125	Nozzle holder c/w nozzle and sealing -- Kompletter Düsenhalter mit Einspritzdüse und Dichtung -- Fuvókátartó fuvókával és tömítéssel, teljes	4	
26a	413.1.08.131	Nozzle holder complete -- Kompletter Düsenhalter -- Fuvókátartó, teljes	4	
27	413.9.08.124	Push rod -- Kompletter Spannstock -- Nyomórúd, teljes	4	
28	413.1.08.120 413.9.08.122	Nozzle spring -- Feder zur Einspritzdüse -- Rugó a fuvókához	4	
29	Pal. DCROS 610 Bosch W0030-41 413.9.08.117a	Nozzle c/w copper washer -- Düse mit Kompletter Kupferdichtung -- Fuvóka teljes, vörösréz tömítéssel	4	
30	8x12 DIN 7603	Sealing -- Dichtung -- Tömítés	8	
31	413.9.08.123a	Hollow screw -- Hohlschraube -- Üreges csavar	4	
32	413.9.08.17	Leak-off pipe Assy -- Komplette Ölleitung, Kupfer / Deckölleitung / -- Résolejveszték, teljes	1	
33	d 3x1 1/2 75 MS 11051	Leak-off pipe -- Ölverbindergerohr, Kupfer -- Résolejztömő	1	

1	2	3	4	5
34	31L.1.1504-085	Fuel pipe Assy from fine filter to connecting hose -- Komplette Kraftstoffleitung zwischen Feinfilter und Anschluss-Schlauch -- Tüzelőanyagvezeték a finomszűrőtől a csatlakozótól, teljes	1	
35	31L-1-1504-091	Fuel pipe from 1st to 2nd connecting hose -- Komplette Kraftstoffleitung zwischen Anschluss - Schlauch I. und Anschluss-Schlauch II. -- Tüzelőanyagvezeték az I. csatlakozótól a II. csatlakozóig	1	
36	31L-1-1504-096	Fuel pipe Assy from second connecting hose to tank -- Komplette Kraftstoffleitung zwischen Anschluss - Schlauch II. und Behälter -- Tüzelőanyagvezeték a II. csatlakozótól a tartályig, teljes	1	

L-VII.

Generator, Startermotor, Heater plug
Lichtmaschine, Starter, Glühkerzen
Dinamó, indítómotor, izzógyertya



L-VII.

L-VII.

Generator, Startermotor, Heater plug
 Lichtmaschine, Starter, Glühkerzen
 Dinamó, indítómotor, izzógyertya

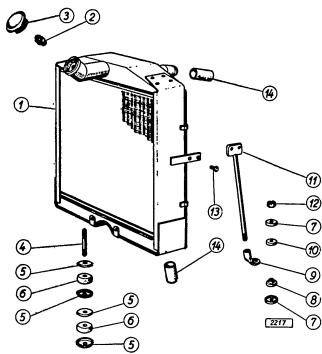
Fig. No. / Abb. Sz.	Description / Bemerkung / Megnevezés	Pc. St. / db.	Remarks / Bemerkungen / Megjegyzés
1	2	3	4
GENERATOR, STARTERMOTOR, HEATER PLUG -- LICHTMASCHINE STARTER, GLÜHKERZEN -- DINAMÓ, INDÍTÓMOTOR, IZZÍTÓGYERTYA			
1	413.9.09.13 Pulley-generator -- Keilriemcselbe, zur Lichtmaschine -- Ékszíjtárcsa a dinamóhoz	1	
2	413.1.09.34 Fastening bracket - generator -- Befestigungsabzweig zur Lichtmaschine -- Leszörfiő kengyel a dinamóhoz	1	
2a	M10 MSz 2210 Lock washer -- Fedorring -- Rugós alátét	4	
2b	M10 MSz 2255 Hexagon nut -- Mutter mit kleiner Schlüsselweite -- Kislapátvá f.anyja	4	
3	4x6,5 MSz 311 Woodruff key -- Scheibenfeder -- Ives retesz	2	
4	Bosch LJ/EK 300/24/1300 AR 7 Generator o/w woodruff key, lock washer and nut -- Lichtmaschine mit Schei-	1	

1	2	3	4	5
		benfeder, Federring und Mutter -- Dinamó íves rendszerrel, rugós alátét tel. és anyával		
5	Bosch BS/VE 300/24/1	Voltage regulator, three oil type -- Spannungserregler -- Feszültség szab- ályozó három osztalékos	1	
6	413.9.06.79	Coupling dog -- Kupplungskeule zur Lichtmaschine -- kapcsolókörű a dinamóhoz	1	
7	413.9.06.61	Lock key to coupling dog -- Befesti- gungsschlüssel zur Kupplungskeule -- Rög- szítők a kapcsolókörűhöz	1	
7a	M6 MSz 2210	Lock washer -- Federring -- Rugós a- látét	1	
7b	M6 MSz 2260	Hexagon nut -- Sechskantmutter -- Hatlapú f.anya	1	
8	Bosch BNG 4/24 CRS 163	Starter motor c/w pinion -- Anlasser- motor mit gebürsteten Zahnradern -- In- dítómotor edzett fogaskerekekkel	1	
8a	M10x130 MSz 2461	Hexagon bolt -- Sechskantschraube -- Hatlapfejű f.csavar	3	
8b	M10 MSz 2210	Lock washer -- Federring -- Rugós a- látét	3	

1	2	3	4	5
8c	M10 MSz 2260	Hexagon nut -- Sechskantmutter -- Hatlapú f.anya	3	
9	413.1.09.61	Heater plug with seal -- Glühkerze mit Dichtung -- Izzógyertya tömítéssel	4	IG-3
9a	M10 MSz 2201	Washer -- Unterlagscheibe -- Pótyos alátét	4	
9b	213.0.09.07a	Insulator assy-heater plug -- Komplette Isolierung zur Glühkerze -- Szige- telő az izzógyertyához	4	
10	413.9.09.37	Resistance between heater plugs II. and III. -- Leitung No.17 Wieder- stand / zu den Glühkerzen II. und III. -- Vezeték a 17.sz. / Ellenállás / a II., III. izzógyertyákhoz	1	
11	180.0.77.34	Resistance between heater plug I. and II., resp. III. and IV. -- Leitung No. 17 zu den Glühkerzen I., II., III., IV. -- Vezeték a 17.sz. I., II., III. és III. IV. izzógyertyákhoz	2	

L-VIII,

Radiator, Tropic and standard type
Tropenkühler und Normalkühler
Trópusi hűtő, normál hűtő



L--VIII.

Fig. No. / Abb. / Abra	No. / No. / Sz.	Description / Benennung / Megnevezés	Pc. / St.	Remarks / Bemerkungen / Megjegyzés
1	2	3	4	5
RADIATOR , TROPIC AND STANDARD TYPE -- TROPENKÜHLER UND NORMALKÜHLER -- TROPUSI HŰTŐ, NORMAL HŰTŐ				
1	1A73-3601	Radiator,tropic design -- Wasserkühler des Ikarus Autobusses 314, Tropenus- führung -- Ikarus 314 típusú autó - busz vízűtő,tropusai kivitel	1	
2	1A60-360113	Pressure valve-radiator -- Sicherheits- ventil zum Wasserkühler -- Biztosi- tőszelvény a vízűtőhöz	1	
2a	1A60-360113-1	Valve housing -- Ventilgehäuse -- Szelepház	1	
2b	1A60-360113-2	Nut-valve -- Ventilmutter -- Szelep anya	1	
2c	1A60-360113-3	Valve cap -- Ventilscheibe -- Sze- leptányér	1	
2d	1A60-360113-4	Spring -- Feder -- Rugó	1	

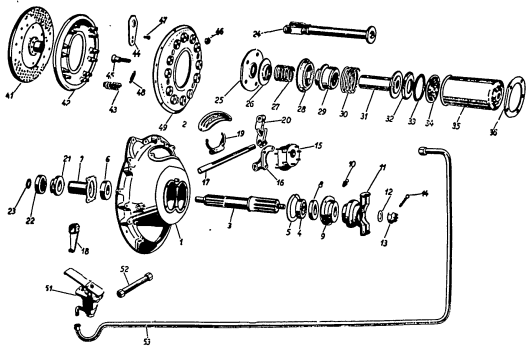
1	2	3	4	5
3	Hex 94-6/U-Sr	Cover -- Verschlusskappe -- Záróap- ka --	1	
3a	Hex-96-6	Sealing ring -- Dichtungering -- Te- mitőgyűrű		
4	M14x1.5x9 MSz 2409	Stud -- Stiftschraube mit Normal- und Feingewinde -- Finon és normálmére- tű ácsokssavar	2	
4a	M14 MSz 2201	Washer -- Unterlagscheibe -- Pényes sájtét	2	
4b	M14x1.5 MSz 2294	Castellated nut -- Kronenmutter mit Feingewinde -- Finommenetű koronás f. anya	2	
4c	3x30 HSz 2224	Cotter pin -- Splint -- Saszeg --	2	
5	A73-36-1	Cap-rubber washer -- Teller sur Gummi- unterlagscheibe -- Tányér a gumia- látóhoz	8	
6	A73-36-2	Rubber washer -- Gummi-Unterlagscheibe -- Gumialátét	4	
7	510V4.5.12	Washer -- Unterlagscheibe -- Alátét	4	
8	1A54-31-36	Rubber washer, flanged -- Gummiunterlag mit Bund -- Vállas gumialátét	2	
9	A73-3602-1	Radiator support -- Stützplatte --	2	

1	2	3	4	5
		Hűtőtámasz talp		
10	1A54-31-37	Rubber washer -- Gummiunterlagscheibe -- Gumialátét		2
11	A73-3602-2 1A54-31-31	Bracket assy-radiator -- Komplette Kühlerfüggőszatange -- Hűtőtámasz rud és vég, teljes		2
11a	M12 MSz 2260	Hexagon nut -- Sechskantmutter -- Hat- lapu f.anya		2
12	M10x1.5 MSz 2294	Castellated nut -- Kronenmutter -- Ko- ronás f.anya		2
12a	3x30 MSz 2224	Cotter pin -- Splint -- Saszeg --		2
13	M10x20 MSz 2467	Hexagon bolt -- Kleinkantschraube -- Kislapátváru tm.f. csavar		4
13a	M10 MSz 2210	Lock washer -- Federring -- Rugós a- látét		4
14	38x5x100 MSz 11051	Water hose -- Wasserschlauch -- Viz- tömlő		2
14a	9 MSz 18714	Hose clamp -- Schlauchbinder mit Splinte zár -- Saszeges tömlőbillincs		4

1	2	3	4	5
14b	9x0,4 MSz 4213	Steel band szalag. -- Stahlband -- Acél-	4	

L-IX.

Clutch and its operation
Kupplung und Betätigung derselben
Tengelykapcsoló és működése



L-IX.

Fig. Abb. Ábra	No. No. Sz.	Description Benennung Megnevezés	Pc. St. db.	Remarks Bemerkungen Megjegyzés
1	2	3	4	5
CLUTCH -- KUPPLUNG UND BETÄTIGUNG DERSELBEN -- TENGELYKAPCSOLÓ ES MŰKÖDTETÉSE				
1	31L.2-2001-001	Clutch housing -- Kupplungsgehäuse Tengelykapcsolóház	1	
1a	31L.2-2001-002	Bearing -- Lager -- Csapágy	1	
1b	GA M8x1 MSz 513	Grease nipple -- Druckschmierknopf mit Kugel	2	
2	380.1.21.68	Cover-clutch housing -- Deckel zum Kupplungsgehäuse -- Fedél a tengely- kapcsolóházhoz	1	
2a	M6x10 MSz 2463	Hexagon bolt threaded to head -- Blanke Sechskantschraube mit Vollgewinde -- Hatlapfejű tá.f. csavar	2	
2b	M6 MSz 2210	Lock washer -- Federring -- Rugós a- léc	2	
3	31L.2.2001.005	Drive shaft -- Kupplungswelle Tengelykapcsoló tengely	1	

1	2	3	4	5
4	61309 MSz 7613	Ball bearing --- Kugellager mit tiefer Rille --- Melyhornyu gyurús golyócsapágy	1	
5	100 MSz 7987	Circlip --- Sprengling mit Feder --- Rugós rugótitokarika	1	
6	35x52x12 MSz 7897	Oil seal ring --- Dichtungering mit Muffe --- Karbantyas tömitőgyűrű	1	
7	31L.2-2001-006	Bearing cover, complete --- Lagerdeckel kompl. --- Csapágyfedél, teljes	1	
7a	M10x62 MSz 2463	Hexagon bolt, threaded to head --- Blanke Sechskantschraube mit Vollgewinde --- Hexagon-Blanke Hat. tm. f. szava	4	
7b	M10 MSz 2210	Lock washer --- Federring --- Rugós alátét	4	
8	60x90x12 MSz 7897	Oil seal ring --- Dichtungering mit Muffe --- Karbantyas tömitőgyűrű	1	
9	31L.2.2001-013	Bearing cap, complete --- Lagerdeckel kompl. --- Csapágyfedél, teljes	1	
9a	M10 MSz 2260	Hexagon nut --- Blanke Sechskantmutter --- Hatlapu f. anya	4	
9b	M10 MSz 2210	Lock washer --- Federring --- Rugós alátét	4	

1	2	3	4	5
10	GA M8x1 MSz 513 300.5.3.06.00	Grease nipple --- Druckschmierknopf mit Kugel --- Golyós zsírozó goab	1	
11	300.5.3.06.00	Clutch centre --- Kupplungsabe, kompl. --- Kezscold egy, teljes	1	
12	180.0.32.140	Washer --- Unterlagecheibe --- Alátét	1	
13	M24 MSz 2265	Castellated nut --- Kronenmutter --- Korondás anya	1	
14	5x45 MSz 2224	Cotter pin --- Splint --- Sasasag	1	
15	31L.2.2001-065	Ring joint, complete --- Zwischenring, kompl. --- Kösbetétgyűrű, teljes	1	
15a	M10x30 MSz 2472	Bolt with hollow head for inner wrench application --- Schraube mit innerer Schlüsselöffnung --- Beled kulcsnyílásu csavar	1	
16	31L-2-2001-041	Front cover --- Vorderer Abschlussdeckel --- Mellés zárófedél	1	
16a	M10 MSz 2260	Hexagon nut --- Sechskantmutter, blank --- Hatlapu f. anya	3	
16b	M10 MSz 2210	Lock washer --- Federring --- Rugós alátét	3	
17	31L-2-2001-051	Throwout shaft --- Ausrückwelle zur	1	

1	2	3	4	5
		Kupplung -- Kiemelő tengely		
17a	M16 MSz 2201 17x17MSz 232	Washer -- Unterlagscheibe, blank -- Fényes alátét	1	
17b	M6 MSz 2260	Circlip -- Sprengring mit Feder -- Ru- gós rugóító karika	1	
18	31L-2-2001- 052	Filter actuating lever, complete -- Hebel zum Kamfilter, kompl. -- Fésűs szűrő mozgatókar, teljes	1	
18a	M6x30 MSz 2461	Hexagon bolt -- Sechskantschraube, blank -- Hatlapfejű f. csavar	1	
18b	M6 MSz 2260	Hexagon nut -- Sechskentmutter, blank Hatlapu f. anya	1	
18c	M6 MSz 2210	Lock washer -- Federring -- Rugós alátét	1	
19	270.0.21.32	Clutch release fork -- Ausdrückgabel -- Kiemelő villa	1	
19a	M6x12 MSz 2466	Hexagon lock screw -- Sechskant-Befes- tigungsschraube -- Hatlapfejű rugó- ító csavar	1	
19b	M6 MSz 2210	Lock washer -- Federring -- Rugós alátét	1	

1	2	3	4	5
20	31L-2-2001- 042	Clutch lever complete -- Kupplungsbe- bel, kompl. -- Tengelykapcsolókar, teljes	1	
20a	M10x42 MSz 2461	Hexagon bolt -- Sechskantschraube, blank Hatlapu f. csavar	1	
20b	M10 MSz 2210	Lock washer -- Federring -- Rugós alátét	1	
21	31L-2-2001- 029	Throwout sleeve -- Ausrückbüchse -- Kiemelő persely	1	
21a	270.0.21.25	Felt ring -- Filaring -- Nemez gyűrű	1	
22	31L-2-2001- 032	Clutch release bearing, complete -- Ausdrücklager, kompl. -- Kiemelő csapágy, teljes	1	
22a	51210 MSz 7512	Single-side-acting thrust ball bearing -- Einseitig wirkendes Scheibenku- gellager -- Egyfelénátó tárcsás gö- lyöcsapágy	1	
23	42 DIN 9045	Circlip -- Sprengring -- Rugóító gyűrű	1	
24	31L-2-2001-06	Piston rod complete front brake cylinder -- Kompl. Kolbenstange zum vorderen Bremszylinder -- Mellső fékhenger dugattyúrúd, teljes	1	

1	2	3	4	5
24a	1448x45x32 MSz 2227	Pin -- Bolzen -- Csapaszeg	1	
24b	4x25 MSz 224	Cotter pin -- Splint -- Saszeg	2	
25	3LL,2-2001-075	Lock plate -- Abschlussplatte -- Zár- rölemez	1	
26	3LL,2-2001- 094	Clutch spring plate assembly -- Feder- teller, kompl. -- Rugótányér, teljes	1	
27	3LL,2-2001- 097	Compensating spring -- Ausgleichfeder -- Kiegyensúlyozó rugó	1	
28	3LL,2-2001- 098	Sleeve -- Zylinderpackung -- Heng- betét	1	
29	3LL,2-2001- 087	Spring drum assembly -- Federgehäuse, kompl. -- Rugóház, teljes	1	
30	3LL,2-2001- 085	Return spring -- Rückzugfeder -- Viss- zaharó rugó	1	
31	3LL,2-2001- 081	Guiding tube c/w pressure plate -- Leitrohr mit Druckscheibe, kompl. -- Vezetőcső nyomólemezrel, teljes	1	
31a	MSz M10x15/2465	Hexagon bolt threaded to head -- Blanke Sechskantschraube mit Vollgewinde -- Hatlapfejű tm.f.csavar	1	
31b	M10 MSz 2260	Hexagon nut -- Blanke Sechskantmutter	1	

1	2	3	4	5
		-- Hatlapu f. anya		
31c	10 MSz 2210	Lock washer -- Federring -- Rugós a- létét	1	
32	L7-0.9	Rubber piston -- Gummikolben -- Gum- dugattyú	1	
33	L7-0.7	Tensioner spring -- Spannfeder -- Fe- szió rugó	1	
34	L7-0.3	Brake piston -- Bremskolben -- Fék- dugattyú	1	
35	L7-0.2	Front brake cylinder -- Vorderer Bremszylinder -- Mellső fékhenger	1	
36	3LL,2-2001- 101	Support plate- front brake cylinder -- Halteplatte zum vorderen Bremszylinder -- Mellső fékhenger tartó- lemez	1	
36a	M10 MSz 2260	Hexagon nut -- Blanke Sechskantmut- ter -- Hatlapu f. anya	1	
36b	M10 MSz 2210	Lock washer -- Federring -- Rugós alétét	1	
-	3LL,2-1101- 000	Clutch unit -- Kupplung -- Tangoly kapocs	1	

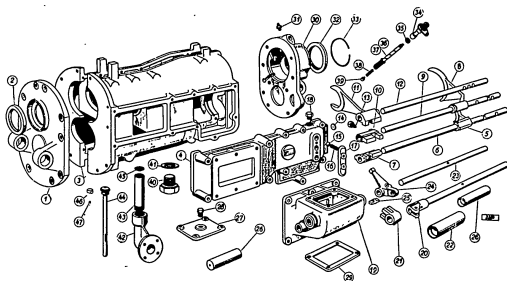
1	2	3	4	5
41	3LL,2-1101-002	Clutch disc assembly -- Mitnehmer - scheibe, komplett -- Tengelykap- csolótárcsa, teljes	1	
42	3LL,2-1101-011	Pressure plate assembly -- Druckplat- te, komplett -- Nyomólap, teljes	1	
43	3LL,2-1101-021	Pressure spring -- Druckfeder -- Nyomórugó	12	
44	3LL,2-1101-023	Throwout lever, complete -- Ausrück- hebel, komplett -- Kinyomókar, tel- jes	6	
45	3LL,2-1101-027	Shackle bolt -- Stellbare Bügelschra- be -- Állító kengyelcsavar	6	
46	3LL,2-1101-028	Adjusting nut -- Stellmutter -- Állító anya	6	
46a	3x40 MSz 2224	Cotter pin -- Splint -- Saszeg	6	
47	3LL,2-1101-032	Clevis pin -- Bügelbolzen -- Ken- gyelcsap	6	
48	3LL,2-1101-033	Tensioner spring -- Spannfeder --	6	

1	2	3	4	5
		-- Feszítőrugó		
49	3LL,2-1101-016	Clutch cover -- Abschlussdeckel zur Kupplung -- Tengelykapcsoló fe- dő	1	
49a	MSz22 MSz 2463	Hexagon bolt, threaded to head -- Sikma Sechskanterschraube mit Voll- gewinde -- Hatlapfejű tm. f. csa- var	12	
49b	MS MSz 2210	Lock washer -- Federring -- Ru- gós alátét	12	
51	5A66-2505 5A66-2504	Clutch pedal valve -- Kupplungs - Pedalventil -- Tengelykapcsoló tápaszoszelep	1	
52	3LL,2-2001-111	Pipe from brake pedal valve to clutch pedal valve -- Rohr - leitung zwischen Bremspedalventil und Kupplungs - Pedalventil -- Csővezeték a fék tápaszoszelep - től a tengelykapcsoló tápaszosze- lepig	1	
53	3LL,2-2001-115	Pipe from clutch pedal valve to	1	

1	2	3	4	5
		operating cylinder -- Rohrleit- ung zwischen Kupplungs - Pedalven- til und Betätigungszylinder -- Csővezeték a tengelykapcsoló taposó- szeleptől a működtető hengerig.		

L-X.

Gear box and linkage
Getriebegehäuse und Gestänge
Sebességváltóház és rudazat



L-X.

Fig. No. / Abb. / Abra	No. / Sr.	Description / Benennung / Megnevezés	Pg. / St. / db.	Remarks / Bemerkungen / Megjegyzés
1	2	3	4	5
GEARBOX AND LINKAGE -- GETRIEBHAUSE UND GESTANGE -- SEBESSVÁLTOZÁS ÉS HUZAZAT				
1	UG-26300	Gearbox type Alfa BII c/w remote control mechanism -- Komplettes Getriebe Type Alfa BII mit Fernschalter zum Ikarus 306 -- Alfa BII típusú sebességváltó távkapcsolóval, teljes előfedélhez	1	
1a	M12x40 MNOSz 2463	Hexagon bolt-front cover -- Sechskantschraube -- Hatlapú fényes csavar a mellő fedélhez	2	
1b	M12x40 MNOSz 2461	Hexagon bolt-front cover -- Sechskantschraube blank, zum vorderen Deckel -- Hatlapú fényes csavar a mellő fedélhez	8	
1c	M12 MNOSz 2260-65	Hexagon nut -- Sechskantmutter, blank -- Hatlapú fényes anya	8	
1d	M12 MSz 2209	Lock washer -- Hasenfederling -- Orrós, rugós alátét	10	

1	2	3	4	5
2	60x80x12 MNOsz 7897	Sealing ring-front cover -- Muffen - dichtung zum Vorderdeckel. -- Kar- mantus kötés a mellső fedélhez	1	
3	UG-6439/B7/ a/b	Gearbox housing, upper and lower half, c/w pin and spacer ring -- Komplettes Getriegehäuse-Ober- und Unterteil mit Befestigungsbolzen zum Abstandering -- Sebességváltóház alsó és felső része rögzítősappal a távtartó gyűrűkhöz, teljes	1	
3a	M10x95 MNOsz 2461-68	Hexagon bolt-gearbox housing -- Sech- skantschraube zum Getriebehäus -- Hat- lapfeji csavar a sebességváltóházhoz	9	
3b	M10x120 MNOsz 2461-68	Hexagon bolt-gearbox housing -- Sech- skantschraube zum Getriebehäus -- Hat- lapfeji csavar a sebességváltóházhoz	3	
3c	UG-890/a c	Hexagon bolt M10x174 -- Sechskantschra- be M10x174 zum Getriebehäus -- Hat- lapfeji csavar, M10x174, a sebesség- váltóházhoz	2	
3d	U G-892/a c	Hexagon bolt M10x160 -- Sechskantschra- be M10x160 zum Getriebehäus -- Hat- lapfeji csavar a sebességváltóházhoz M10x160	1	

1	2	3	4	5
3e	UG-11665/a	Hexagon bolt M10x140 -- Sechskantschra- be M10x140 zum Getriebehäus -- Hat- lapfeji csavar a sebességváltóházhoz M10x140	2	
3f	U G-893/a c	Hexagon bolt M10x145 -- Sechskantschra- be M10x145 zum Getriebehäus -- Hat- lapfeji csavar a sebességváltóházhoz M10x145	1	
3g	M10x20 MNOsz 2213	Lock plate - Hexagon bolt -- Siche- rungsblech zu den Sechskantschrauben -- Bistóaitólemes a hatlapfeji csa- varokhoz	18	
4	UG-11150/a c	Side cover-gearbox housing -- Seiten- deckel des Getriebehäus -- Sebes- ségváltóház oldalfedél	1	
4a	M10x65 MNOsz 2461-68	Hexagon bolt-gearbox housing side cover -- Sechskantschraube zum Seiten- deckel des Getriebehäus -- Hatlap- feji csavar a sebességváltóház oldal- fedélhez	6	
4b	M10x95 MNOsz 2461-68	Hexagon bolt-gearbox housing side cover -- Sechskantschraube zum Seiten- deckel des Getriebehäus -- Hatlap- feji csavar a sebességváltóház ol-	4	

1	2	3	4	5
		dalfedélhez --		
4c	M10x20 MN08z 2213	Lock plate -- Sicherungsblech zu den Sechskantschrauben -- Hístovitéle- mes a hatlapfejű csavarokhoz	10	
5	UG-904/a	Shifting fork reverse -- Schaltgabel zum Rückwärtsgang -- Kapsolóvilla a hátramenethoz	1	
6	UG-911/a	Shifting rod reverse -- Schaltstange zum Rückwärtsgang -- Kapsolórúd a hátramenethoz	1	
7	UG-908/c UG-912	Shifting rod head o/w stop pin to reverse -- Kupplungskopf zum Rückwärtsgang mit Ausschlagbolzen, komplett -- Kap- solófej a hátramenethoz ütközőcsappal talál	1	
8	UG-6288/a	Gear shifting fork to 1st and 2nd speed -- Schaltgabel zum 1. und 2. Gang -- Kapsolóvilla az 1. és 2. sebességhez	1	
9	U G-910/a	Shifting rod to 1st and 2nd speed -- Schaltstange zum 1. und 2. Gang -- Kap- solórúd az 1. és 2. sebességhez	1	
10	UG-907/a	Shifting rod head to 1st and 2nd speed -- Kupplungskopf zum 1. und 2. Gang Kapsolófej az 1. és 2. sebességhez	1	

1	2	3	4	5
11	UG-6289/b	Gear shifting fork to 3rd and 4th speed -- Schaltgabel zum 3. und 4. Gang -- Kapsolóvilla a 3. és 4. sebességhez	1	
12	U G-909/c	Shifting rod to 3rd and 4th speed -- -- Schaltstange zum 3. und 4. Gang -- Kapsolórúd a 3. és 4. sebességhez	1	
13	UG-913/b	Fixing bolt to shifting forks and rods -- Stellschraube zu den Schaltgabeln und Schaltstangen -- Rögzítő csavar a kapsolóvillákhoz és kapsolórúdk- hoz	5	
14	UG-26350	Cover-gearbox housing -- Abschluss -- deckel zum Getriebegehäuse der Schalt- stangen -- Zárófedél a sebesség - váltófedél kapsolórúdkhoz	1	
14a	M5x12 MN08z 2463	Hexagon bolt -- Sechskantschraube -- Hatlapfejű csavar	4	
15	14,5 MN08z 7870	Lock ball-shifting rods -- Sperrkugel zu den Schaltstangen -- Zárógolyó a kapsolórúdkhoz	5	
16	UG-914	Lock spring -- Klappenfeder zur Sperr- kugel -- Csapórúgó a zárógolyókhoz	3	
17	U G-822	Cover-look spring -- Deckel zu den Klappenfedern -- Fedél a zárórúgk- hoz	1	

1	2	3	4	5
17a	UG-900/a	Hollow screw-cover -- Hohlschraube zur Befestigung des Deckels -- Puratos csavar a fedél felszereléséhez	2	
18	C 1/2 MNOSz 2459	Lock plug-gearbox cover -- Schrauben - stöpsel in den Getriebegehäusendeckel zu dem Sperrkegel -- Dugócsavar a sebességváltóházfedélbe a zárgolyókhoz	1	
19	UG-11152/w.d. UG 2447/c	Remote control case c/w bushes -- Komplettes Fernschaltergehäuse mit Büchsen -- Távkapcsolóház perselyekkel, teljes	1	
19a	M10x25 MNOSz 2463-5D	Hexagon bolt-remote control case -- Sechskantmutter zum Fernschaltergehäuse -- Hatlapfejú csavar a távkapcsolóhoz	5	
19b	M10x20 MNOSz 2213	Lock plate -- Sicherungsblech zur Sechskantschraube -- Biztonságoslemez a hatlapfejú csavarokhoz	5	
20	UG-26269/A	Remote control shaft c/w lock sleeve -- Komplette Fernschalterwelle mit Kupplungshülse -- Távkapcsolótengely szorítóhüvellyel, teljes	1	
21	UG-11161/ya	Gear shifting fork to remote control shaft -- Schaltgabel zur Fernschalt-	1	

1	2	3	4	5
21a	UG-3833/b	tterwelle -- Kapsolóvilla a távkapcsolótengelyhez Shifting fork-remote control shaft -- Befestigungsschraube zur Schaltgabel -- Rögzítőcsavar a kapsolóvillához	1	
21b	M10 MNOSz 2260	Hexagon bolt -- Sechskantmutter, blank zur Befestigungsschraube -- Hatlap i,anya a rögzítőcsavarhoz	1	
22	UG-11453	End cap-remote control shaft -- Komplette Achsenendverkleidung zur Fernschalterwelle -- Tengelyvégburkolat teljes, a távkapcsolótengelyhez	1	
23	UG-3837/b	Shaft gear shifting lever -- Welle zum Schalthebel des Getriebes -- Tengely a sebességváltó kapsolókarhoz	1	
24	UG-11160/A	Gear shifting lever -- Getriebe-Schalt - hebel -- Sebességváltó kapsolókar	1	
24a	UG-3833/b	Fixing bolt-gear shifting lever -- Arretierschraube zum Getriebe-Schalt - hebel -- Rögzítőcsavar a sebességváltó kapsolókarhoz	1	
24b	M10 MNOSz 2260	Hexagon nut -- Sechskantmutter, blank zur Arretierschraube -- Hatlap i,anya a rögzítő csavarhoz	1	

1	2	3	4	5
25	UG-11162/wd	Pin-gear shifting lever -- Bolzen zum Getriebschalthebel -- Csap a sebességváltó kapcsolókarhoz	1	
26	UG-11454	End cap-gear shifting lever -- Kompl. Achsenendverkleidung zur Getriebe-Schalthebelwelle -- Tengelyvégburkolat a sebességváltó kapcsolókar tengelyhez, teljes	2	
27	UG-3830	Upper cover-remote control case -- Oberdeckel des Fernschaltgeräteses -- Felső fedél a távkapcsolóházhoz	1	
27a	M10x20 MNOSz 2463	Hexagon bolt-cover -- Sechskantschraube zum Oberdeckel -- Hatlapfejú csavar a felső fedélhez	4	
27b	M10x20 MNOSz 2213	Lock plate-hexagon bolt -- Sicherungsblech zur Sechskantschraube -- Birtositólemez a hatlapfejú csavarhoz	4	
28	UG-11662	Air-vent plug-top cover -- Entlüftungsschraube zum Oberdeckel -- Szellőzőcsavar a felső fedélhez	1	
29	UG-11155	Bottom cover-remote control case -- Unterdeckel des Fernschaltgeräteses -- Alsó fedél a távkapcsolóházhoz	1	
29a	M10x20	Hexagon bolt-bottom cover -- Sechs-	4	

1	2	3	4	5
	MNOSz ²⁴⁶³⁻⁶⁵ 2213-68	kantschraube zum Unterdeckel -- Hatlapfejú csavar az alsó fedélhez		
29b	M10x20 Msz 2245	Lock plate -- Sicherungsblech zur Sechskantschraube -- Birtositólemez a hatlapfejú csavarhoz	4	
30	UG-26301/A	Rear cover-gearbox -- Hinterdeckel des Getriebes -- Hátsó fedél a sebességváltóhoz	1	
30a	M10x20 MNOSz 2461-66	Hexagon bolt -- Sechskantschraube zum Hinterdeckel -- Hatlapfejú csavar a hátsó fedélhez	3	
30b	M10x60 MNOSz 2461-66	Hexagon bolt-rear cover -- Sechskantschraube zum Hinterdeckel -- Hatlapfejú csavar a hátsó fedélhez	1	
30c	M10x50 MNOSz 2461	Hexagon bolt-rear cover -- Sechskantschraube zum Hinterdeckel -- Hatlapfejú csavar a hátsó fedélhez	5	
30d	M10x20 MNOSz 2213	Lock plate-hexagon bolt -- Sicherungsblech zur Sechskantschraube -- Birtositólemez a hatlapfejú csavarhoz	9	
31	A M10x1 MNOSz 374	Grease nipple-rear cover -- Druckerschmierkopf mit Angel zum Hinterdeckel -- Csolyós szűrésőmb hűtő fedélhez	1	
32	70x90x12 MNOSz 7897	Oil sealing ring-rear cover -- Wellendichtung zum Hinterdeckel -- Karmatytus tömítés a hátsó fedélhez	1	

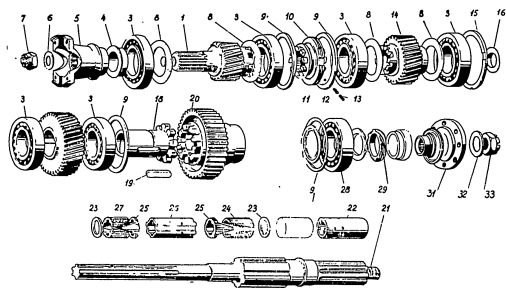
1	2	3	4	5
33	UG-26297	Circlelip -- Sicherungerring zur Well- abdichtung -- Biztosító karika a kormányhajtáshoz	1	
34	UG-26307	Thrust bearing-speedometer drive -- Stützlager zum Antriebsrad des Ge- schwindigkeitmessers -- Támasp- ágy a sebességmérő fogaskerékhez	1	
34a	M6x15 MNOSz 2461	Hexagon bolt-thrust bearing -- Sechse- kantschraube blank, mit Vollgewinde zum Stützlager -- Hatlapfejű tö- vigműntes csavar a támaszpágyhoz	1	
35	UG-883	Thrust plate-driven gear of speedometer drive -- Druckscheibe zum An- triebsrad des Geschwindigkeitmessers -- Nyomótárcsa a sebességmérő haj- tott fogaskerékhez	1	
36	UG-26380/a	Driven gear-speedometer drive 18 teeth -- Antriebsrad des Geschwindig- keitsmessers Z - 18 -- Sebes- ségmérő hajtott fogaskerék Z - 18	1	
38	U'G-884	Spring driven gear of speedometer drive -- Feder zum Antriebsrad des Geschwindigkeitmessers -- Rugó a sebességmérő hajtott fogaskerék- hez	1	

1	2	3	4	5
39	UG-2927	Pin-spring -- Stift zur Feder -- Csap a rugóhoz	1	
40	O1 1/4" MNOSz 2459	Oil drain plug-gearbox -- Ölablans- schraube zum Getriebegehäuse -- Olajleeresztő dugócsavar a sebesség- váltóházhoz	1	
41	55x32x2	Sealing - plug -- Dichtung zur Ölablass-Schraube -- Fémítés a dugócsavarhoz	1	
42	UG-11154/a	Oil filler pipe -- Öleinfullrohr -- Olajbetöltő cső	1	
42a	M10x20 MNOSz 2463-K	Hexagon bolt -- Sechskantschraube zum Öleinfullrohr -- Hatlapfejű csavar az olajbetöltő csőhöz	4	
42b	UG-927/a	Lock plate -- Sicherungsblech zur Sechskantschraube -- Biztosító lemez a hatlapfejű csavarhoz	4	
43	UG-6500	Oil filler extension -- Ansatz zum Öleinfullrohr -- Toldat az olaj- betöltő csőhöz	1	
44	UG-6499/a/b	Dipstick c/w cover -- Kompletter Öl-	1	

1	2	3	4	5
	U G-6502/a	standmesstab zum Oleinfullrohr -- Olajszintmérő pálcza, fedőlel, teljes, az Olajbetöltő toldathoz		
45	44x37x2,5	Oil resisting rubber sealing-dipstick -- Olíeszto gumtűcsiga zum Ölstandmes- stab -- Olajálló gumtűcsiga az olajszintmérő pálcza teljeshez	1	
46	UG-6503	Spring-dipstick -- Feder zur Befes- tigung des Ölstandmesstabes -- Rugó az Olajszintmérő pálcza rögzítéséhez	1	
47	6,35 MRO8z 7870	Steel ball-dipstick -- Stahlkugel zur Befestigung des Ölstandmesstabes -- Acélgolyó az Olajszintmérő pálcza rögzítéséhez.	3	

L-XI.

Gear box shafts and gears
Getriebewellen und Zahnräder
Sebességváltó tengelyek és fogaskerekek



L-XI.

Fig. No. / Ábra	No. / Sz.	Description / Bemennung / Megnevezés	Pt. / St.	Remarks / Bemerkungen / db. / Megjegyzések
1	2	3	4	5
GEAR BOX SHAFTS AND GEARS -- GETRIEBEWELLEN UND ZAHNRÄDER SEBESSÉGVÁLTÓ TENGELEK ES FOGASKEREK				
1	UG- 26302 26346	Drive gear 25 teeth -- Zahnrad mit Helle z=25 -- Tengelyes fogaskerék z=25	1	
3	61213 MNOSS 7612	Single-row ball bearing 2 pieces to the drive gear, 2 pieces to the gear of the 3rd speed, 2 pieces to the gear of the 2nd speed. -- Kugellager mit tie- fer Rille zu den 2 Schaftritzeln 2 Stück zum 3. Gang, 2 Stück zum 2. Gang -- Melyhornyu gölyöcsapágy 2 db. tol- gelyes fogaskerékhez 2 db. 3.sebes- ség fogaskerékhez, 2db. 2.sebeség fo- gaskerékhez	6	
4	UG-26302/a	Flanged clamping ring-front bearing of the drive shaft gear -- Flaschenfe- derring zum vorderen Lager des Schaf- tritzels -- Peremes acsritógyűrű a	1	

1	2	3	4	5
		tengelyes fogaskerék mellés' csapágyá- hoz		
5		Coupling-hub-drive gear -- Schalthnabe zum Schaftritzel -- Kapcsolóagy a tengelyes fogaskerékhez	1	
6	180.0.32.140	Washer-coupling hub -- Unterlagscheibe zur Schalthnabe -- Alátétárca a kapcsolóagyhoz	1	
7	M24x1.5 MNGS' 2292- 68	Fine-threaded flat castellated nut -- Flache Kronenmutter mit Feingewinde Finommenetű alacsonykoronás anya	1	
8	UG-877	Oil thrower disc 1 piece to the rear bearing of the drive, 2 pieces to the gear of the 3rd speed -- Ölspritz- scheiben, 1 Stück zum hinteren Lager des Schaftritzels, 2 Stück zum Zahn- rad des 3. Ganges -- Olajmérő tár- csa, 1 db, tengelyes fogaskerék hát- só csapágyhoz, 2 db, 3. sebesség fogas- kerékhez	4	
9	UG-11653/a	Spacer ring, 3 pieces to item 3, 1 piece to item 29, -- Abstandering /Zwi- schenring/, 3 Stück zu Posten No. 3., 1 Stück zu No. 29. -- Gyártásgyü- rű 3 db, a 3. tételhez, 1 db, a 29. té- telhez	4	

1	2	3	4	5
10	UG-851/a,c	Gear shift sleeve on the drive shaft for the 3rd and 4th speed -- Schalthül- se 3. und 4. Gang an der Vorlege- gewelle -- Kapcsolóhüvely a 3. és 4. sebességhez a fő tengelyen	1	
11	8 MNGS 7870	Lock ball-splined sleeve -- Kugel zur Befestigung der Rillenhülse -- Go- lyó a bordahüvely rögzítéséhez	6	
12	UG-1925	Spring-lock ball -- Feder zur Kugel Rugó a gölyökhoz	6	
13	M10x12 MNGS 2422	Spring fastening grub screw -- Gewin- dschraube zur Befestigung der Feder Hernyócsavar a rugó rögzítéséhez	6	
14	UG-2082/a 26347	Gear on the drive shaft for the 3rd speed Z-33 teeth -- Zahnrad zum 3. Gang an der Hauptwelle Z-33 -- Fo- gaskerék a 3. sebességhez Z-33	1	
15	UG-11654/e	Spacer ring on the drive shaft between the 4th and 5th ball bearings -- Abstandering zwischen 4. und 5. Ku- gellager an der Vorgelegewelle -- Hirtastógyűrű a 4. és 5. gölyöcsapá- gy között a fő tengelyen	1	
16	UG-11651	Thrust washer -- Anlaufscheibe -- Ny- mótárca	1	

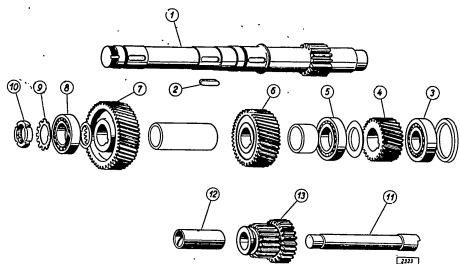
1	2	3	4	5
17	UG- 3187/a 834/b	Gear on the drive shaft for the 2nd speed 44 teeth -- Zahnrad zum 2. Gang an der Vorgelegewelle Z=44 -- Fogaskerék a 2. sebességhez a főtengelyen Z=44	1	
18	UG-3187/b	Gear shift sleeve on the drive shaft for the 2nd speed -- Schaltheile zum 2. Gang an der Vorgelegewelle -- Kapcsolóhüvely a 2. sebességhez a főtengelyen	1	
19	UG-11787	Key-pin - gear shift sleeve -- Rund - stirnige Passfeder zur Schaltheile -- Feszkes retesz a kapcsolóhüvelyhez	2	
20	UG-826/a	Sliding gear on the drive shaft for the 1st speed and reverse, 40 teeth -- Schaltzahnrad zum 1. Gang und Rücklauf an der Vorgelegewelle Z=40 -- Kapcsoló fogaskerék 1. és hátra sebességhez a főtengelyen Z=40	1	
21	UG- 3187/a 2634/a	Gear box drive shaft -- Vorgelegewelle - Sebességváltó főtengely	1	
22	UG-3184/d	Bearing bush-shift sleeve -- Lagerbüchse zur Schaltheile -- Csapágyperelye a kapcsolóhüvelyhez	1	
23	UG-11652	Thrust plate-lock sleeves -- Anlauf-	2	

1	2	3	4	5
		scheibe zu den Abstandshülsen -- Nyomótárcsa a feszítőhüvelyekhez		
24	UG-3010/b	Pair of lock sleeves to the 3rd speed -- Abstandshülsenpaar zum 3. Gang -- Feszítőhüvely pár a 3. sebességhez	1	pair pair
25	UG-2922/a	Tensioner key-lock sleeves -- Spannkeilhülse zu den Abstandshülsenpaaren -- Feszítőhüvely a feszítőhüvely párokhoz	2	
26	UG-827/b	Spline sleeve - gear shift sleeve -- Rillenhülse zur Schaltheile -- Bördőhüvely a kapcsolóhüvelyhez	1	
27	UG-3011/a	Pair of lock sleeves - 4 th speed -- Spannhülsenpaar zum 4. Gang -- Feszítőhüvely pár a 4. sebességhez	1	pair pair
28	61311 MNGSz 7613	Ball bearing-drive shaft -- Kugellager mit tiefer Rille zur Vorgelegewelle -- Műanyagú golyós csapágy a főtengelyhez	1	
29	UG-26379/a	Worm with bore-hole, 11 teeth --	1	

1	2	3	4	5
		Durchbohrte Schnecke -- Furatos csiga, Z= 11		
31	31L.2-2700-002	Coupling hub 6 C-S-drive shaft, complete -- Komplette Schaltmaße 6 C-S zur Vorgelegewelle -- kapcsolóház 6 C-S a főtengelyhez, teljes	1	
32	510S2-5,21	Washer-castellated nut -- Unterlag-scheibe zur Kronenmutter -- Alátét a koronás anyához	1	
33	M30x1.5 M30S2 2292-68	Fine-threaded flat castellated nut drive shaft -- Flache Kronenmutter mit Feingewinde zur Vorgelegewelle -- Finommenethű alacsonykoronás anya a főtengelyhez.	1	

L-XII.

Gear box layshaft and gears
 Getriebe-Vorgelegewelle und Getriebekäder
 Sebességváltó, előtétengely és fogaskerekek

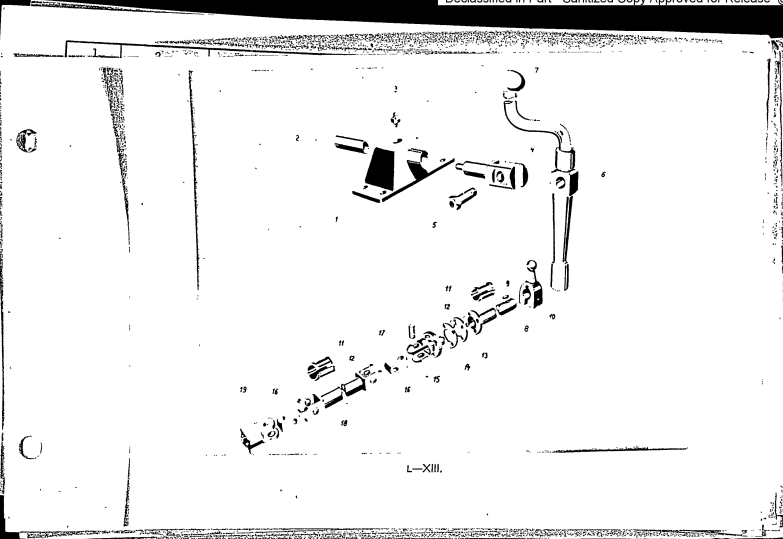


L-XII.

Fig. No. / Abbr.	No. / Sz.	Description / Benennung / Megnevezés	Pc. / St. / db.	Remarks / Bemerkungen / Megjegyzés
1	2	3	4	5
GEAR BOX LAYSHAFT AND GEARS - GETRIEBE - VORLEGEWELLE UND GETRIEBERÄDER - SEBESSÉGVÁLTÓ ELŐTÉTENGELY ÉS FOGASKEREK				
1	UG-26315/B	Layshaft with gear for 1st speed, 15 teeth Vorgelegewelle mit Zahnrad zum 1. Gang Z = 15 -- Előtétengely fogaskerekkel 1. sebességhez Z = 15	1	
2	MSz-2306	Lock key-layshaft -- Rundstirnige Passfeder zur Vorgelegewelle -- Pészkos retesz az előtétengelyhez	3	
3	61209 MNOSz 7613	Ball bearing rear-layshaft -- Hinteres Kugellager mit tiefer Rille zur Vorgelegewelle -- Műhorvny golyós csapágy, hátsó, az előtétengelyhez	1	
4	UG-851/b	Gear for the 2nd speed on the layshaft, 28 teeth -- Zahnrad zum 2. Gang an der Vorgelegewelle, Z = 28 -- Fogaskerék a 2. sebességhez az előtétengelyen Z = 28	1	
5	61211 MSz 76/2	Ball bearing, middle-layshaft -- Mittle-	1	

1	2	3	4	5
6	UG-839/b	res Kugellager mit tiefer Rille zur Vorgewelle -- Melyhornyu golyós csapágy, köcsap, előtétengelyhez		
7	UG-838/b	Gear for 3rd speed on the layshaft, 39teeth -- Zahnrad zum 3. Gang an der Vorgewelle Z=39 -- Fogaskerék a 3. seb.- hez előtétengelyen Z=39	1	
8	61210 7642 MNOSz 7890	Gear for 3rd speed on the layshaft, 47teeth -- Zahnrad zum 4. Gang an der Vorgewelle Z=47 -- Fogaskerék a 4. se- beséghez az előtétengelyen Z=47	1	
9	50 MNOSz 7890	Ball bearing, front-layshaft -- Vorderes Kugellager mit tiefer Rille zur Vorgewelle -- Melyhornyu golyós csapágy nyélhez az előtétengelyhez	1	
10	WFOxl, 2 MNOSz 7889	Lock plate to the splined bearing nut -- Sicherungsgeloch zur gerillten Lager- mutter -- Birt. lemez hornyos csapágy nyélhez	1	
11	UG-917/b	Bearing nut-layshaft -- Lagermutter/Büch- senmutter zur Vorgewelle -- Csap- ágyanya az előtétengelyhez	1	
12	UG-918/a	Shaft-reverse gear -- Welle zum Rück- laufzahnrad -- Tengely, hátramenet - fogaskerékhez	1	
13	UG-829A	Bearing bush-reverse gear -- Lagerbüch- se zum Rücklaufzahnrad -- Csapágyper- sely a hátramenet fogaskerékhez Double reverse gear 17-22 teeth -- Doppel- zahnrad, Rücklauf -- Kettős fog.k. hátramenet.	1	

L-XIII
Remote control
Fernschalter
Távkapcsoló



L-XIII.

Fig. No. /bra	No. No. /sz.	Description /Bemerkung /Megnevezés	Pc. /Sz.	Remarks /Bemerkung /Megjegyzés
1	2	3	4	5
REMOTE CONTROL -- FERNSTEUERER -- T VILÁCSOLÓ				
-	311.4-2101-000	Remote control	1	
1	311.4-2101-001	Bracket, assembly	1	
2	311.4-2101-001	Bush	1	
3	G1 M8x1 HSp 513	Grease nipple with ball	4	
4	311.4-2101-014	Fork	1	
4a	M4x1,5 HSp 2294	Castellated nut	2	
4b	M4 HSp 2201	Washer	2	

1	2	3	4	5
40	4x40 MSZ 2224	Cotter pin -- Splint -- Szaszeg	2	
5	31L.4-2101-027	Threaded pin -- Gewindertift -- Menetes csap	1	
6	31L.4-2101-021	Gear change lever assembly -- Scholt-hobel vollst. -- Sebességváltókar teljes	1	
7	270.0.35.36/B	Lever knob -- Schalthobelgriff -- Kapszológomb	1	
8	31L.3-2101-031	Selector rod I. assembly -- Gestänge I. vollst. -- Rud I. teljes	1	
9	6x7x20 MSZ 2306	Recessed key -- Rundstirnige Passfeder -- Pászkes retesz	1	
10	31L.3-2101-035	Ball gear shift lever -- Kugelselenk-hobel -- Gombocuklás kar	1	
10a	M8x50 MSZ 2461	Hexagon nut -- Sechskantmutter -- Hatlapfeju f. csavar	1	
11	310.85-5.76	Sleeve-half, upper -- Obere Halbbüchse -- Felsőfél felrag	2	
12	310.85-5.77	Sleeve-half, lower -- Untere Halbbüchse -- Felsőfél alsó	2	
13	1A54-40-138	Fibre washer -- Fiberscheibe -- Pi-bertárcsa	2	

159 /M/

1	2	3	4	5
14	1A54-40-139	Shim -- Zwischenscheibe -- Betét-tárcsa	4	
15	3A54-40-132	Adjusting head -- Einstellkopf -- Beállító fej	1	sz/
15a	M8x35 MSZ 2463	Hexagon bolt, threaded to head -- Elcske Sechskantschraube mit Vollgewinde -- Hatlapfeju ts. f. csavar	4	
15b	M6 MSZ 2260	Hexagon nut -- Elcske Sechskantmutter -- Hatlapu f. any	4	
15c	M6 MSZ 2210	Lock washer -- Federring -- Rugós slátét	4	
16	2A54-40-65	Joint insert -- Gelenkeinschlag -- Csuklóbetét	2	
17	3A54-40-69	Knuckle pin -- Stift -- Csapzeg	4	
18	31L.4-2101-034	Selector rod II. assembly -- Gestänge II. vollst. -- Rud II. teljes	1	
19	31L.3-2101-033	Squearing fork -- Pressgabel -- Szoritóvilla	1	
19a	M6x1x5 MSZ 2490	Hexagon bolt -- Sechskantschraube -- Hatlapfeju f. csavar	1	

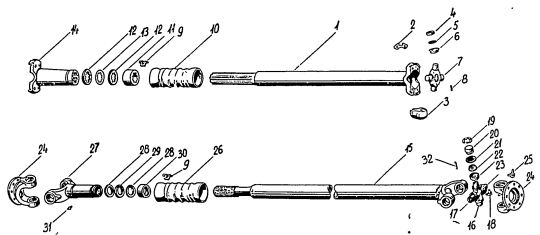
161 /M/

1	2	3	4	5

165 /w/

L-XIV.

Propeller shafts with universal joint
Gelenkwelle
Csuklóstengely



L-XIV.

Fig. No. / Abt. / Azs.	No. / Sz.	Description / Benennung / Megnevezés	Pa. St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
PROPELLER SHAFTS WITH UNIVERSAL JOINT — GÉLENKWELLE — CSUKLÓSTENGELY				
-	31L.2-2701-000	Front propeller shaft assy — Zusammenstellung der vorderen Gelenkwelle — Mellső csuklótengely 5,6.	1	
1	31L.2-2701-002	Front propeller shaft, complete — Vordere Gelenkwelle komplett — Mellső csuklótengely teljes	1	
2	270.0.31.62	Lock plate - coupling flange — Sicherungsblech aus Flansch — Biztosítólemez a karimához	8	
2a	360.1.31.67	Hexagon bolt — Sechskantschraube zur Befestigung des Gelenkkopfes — Hatlapfejű csavar a csuklófej felerősítéséhez	16	
-	ES 413-24	Universal joint 50, complete — Gelenk 50 teljes — Kardáncszék 50 komplet	2	

1	2	3	4	5
-	380.9.31.12	Joint head with cap, gasket and roller — Gelenkkopf mit Kappe, Dichtung und Rolle — Csuklófej sapkával, tömítés-sel, görgővel	8	
3	380.1.31.13	Joint head — Gelenkkopf — Csuklófej	8	
4	380.1.31.15	Cap — joint head — Kappe zum Gelenkkopf — Sapka a csuklófejhez	8	
5	380.9.31.16	Gasket — joint head — Dichtung zum Gelenkkopf — Tömítés a csuklófejhez	8	
6	380.9.31.14	Protecting ring — universal joint — Schuttring zum Gelenkkreis — Védőgyűrű a csuklókeresztveshez	8	
7	380.9.31.11	Spider — Gelenkkreis — Csuklókereszt	2	
-	380.9.31.10	Spider with protecting rings and core ring — Gelenkkreis mit Schuttringen und Kernstutzen — Csuklókereszt védőgyűrűkkel és maglyukelábróda-gyűrűvel	2	
8	380.1.31.59	Bearing roller — Lagerrolle — Csapágygörgő	216	
9	9MS 18714	Hose clip lock with cotter pin — Schlauchschellenverschluss mit Splint — Bessleges táskabilincsár	4	

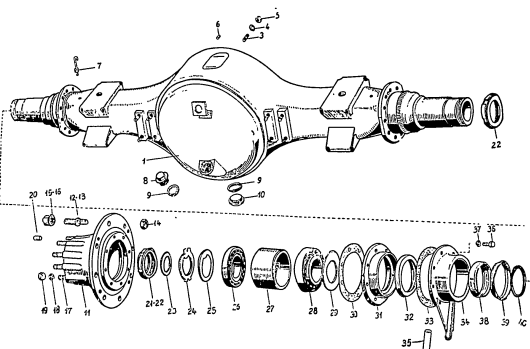
1	2	3	4	5
9a	9x0,4 ABal MS 4213	Joining strap to the dustproof gaiter — Schlauchbinderband zur Stulpe — Kötő szalag a porvédő harsonnikához	4	9x0,4x336
10	423.594	Dustproof gaiter — Stulpe — Porvédő	1	
-	270.0.31.63	Splined flange with sealing disc, core plug and cap — Flanschichtung mit Zwischenscheibe, Kernstutzen und Kappe — Hornyos pereszékítő kőbelsővel és maglyukelábróval, sapkával	1	
11	270.0.31.67	Sealing cap to the splined flange — Dichtungskappe zum Nutflansch — Tömítőkápa a hornyospereszékhez	1	
12	270.0.31.65	Sealing disc to the splined flange — Dichtungsscheibe zum Nutflansch — Tömítőkőbelső hornyos pereszékhez	1	
13	270.0.31.66	Intermediate disc to the splined flange — Zwischenscheibe zum Nutflansch — Kőbelsőháza hornyos pereszékhez	1	
14	270.0.31.64	Splined flange 50 — Nutflansch 50	1	
-	31L.2-2703-000	Rear propeller shaft assembly — Zusammenstellung der hinteren Gelenkwelle — Hátsó csuklódetangely 0,4.	1	
15	31L.2-2703-000	Rear propeller shaft, complete — Hin-	1	

1	2	3	4	5
		tere Gelenkvalle Komplette — Hátad osaklőstengely teljes	1	
16	380.9.31.109	Spider, complete — Komplettes Gelenk- kreuz — Csuklőkereszt teljes	2	
17	380.9.31.109	Protecting ring — Schutzing — Véd- gyűrű	8	
17a	380.9.31.110	Spider without protecting rings — Ge- lenk kereszt ohne Schutzing — Csuk- lőkereszt védőgyűrű nélkül	2	
18	GC M8x1 M8a51	Grease nipple — Druckschmierknopf mit Kugel — Golyós szűrőgomb	2	
19	380.9.31.118	"K" ring, retainer I, Befestigung — K, rögzítő- gyűrű	8	
-	380.9.31.112	Bearing shell, complete — Komplette Lagerschale — Csapágyházasa teljes	8	
20	380.9.31.113	Bearing shell — Lagerschale — Csap- ágyházasa	8	
21	380.9.31.115	Retaining plate — Haltblech — Tar- tótábla	8	
22	380.9.31.116	Gasket — Dichtung — Tömítés	8	
23	380.9.31.114	Cap — Kappe — Sapka	8	

1	2	3	4	5
24	380.9.31.104	Articulated flange — Flansch samt Spritzblech — Csuklós perem	2	
25	10 KX 683	Lock plate — Sicherungsblech — Bin- tőtáblás lemez	16	
25a	380.9.31.104	Hexagon bolt — Sechskantenschraube — Hatlapfejű csavar	16	
25b	M021 M8a 2290-80	Hexagon bolt — Sechskantenschraube, blank — Hatlapfejű anya	16	
26	31L 2-2703-035	Dustproof gaiter — Stulpe — Porvédő	1	
27	380.9.31.107	Splined flange, complete — Kompl. Nut- flansch — Horvós csuklós teljes	1	
27a	56KH 564	Core plug — Kernstopfen — Maglyuk elvártó	1	
28	380.9.31.84	Shim — Wellenschleife — Kösbetétár- osa	2	
29	380.9.31.83	Felt packing — Filzdichtung — He- szőtműtő	2	
30	380.9.31.82	Sealing cap — Dichtungskappe — Töm- ítőkupka	1	
31	GA M8x1 M8a51	Grease nipple — Druckschmierknopf — Golyós szűrőgomb	1	
32	2,5x19,8 DIN62	Needle roller — Nadelrolle — Rugórgő	304	

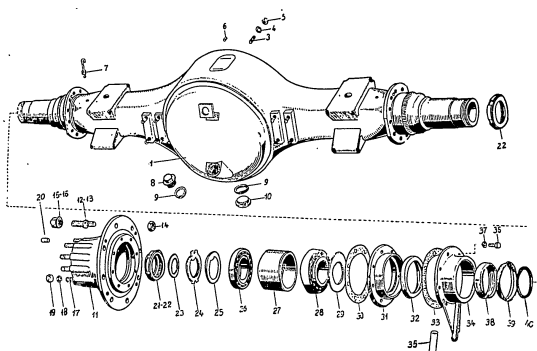
L—XV.

Rear axle unit and rear wheel hub
Hinterachsbrücke und Hinterradnabe
Hátató híd és hátató kerékagy



L-XV.

Fig. No. / Abb. / Ábra	No. / Sz.	Description / Bezeichnung / Megnevezés	Po. / St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
REAR AXLE UNIT AND REAR WHEEL HUB — HINTERACHSBÜCKE UND HINTERRADWÄRE — HÁTSÓHID ÉS HÁTSÓ KERÉKAJY				
-	31L.0.33.00	Rear axle casing assy — Hinterachshäuse, zusammenmontiert — Hátsó tengelyház 2,4.	1	
1	31L.033.76R.n	Rear axle casing — Hinterachsbücke — Hátsó tengelyház	1	
3	M10x30 SS MS2402-80A	Stud — rear axle casing — Stiftschraube sur Hinterachsbücke — Assokovar a hátsótengely házhoz	16	
4	M10 MSz 2210	Lock washer — Federring — Rugós alátét	16	
5	M10 MSz 2260-68	Hexagon nut — Sechskantmutter, blank — Hatlapp f. anya	18	
6	10x14 MSz 2210	Dowel pin — Pasztift — Illesztőszeg	1	



L-XV.

Fig. No. / Abb. / Ábra	No. / No. / Sz.	Description / Benennung / Megnevezés	Q'ty. / Stk. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
REAR AXLE UNIT AND REAR WHEEL HUB — HINTERACHSBRÜCKE UND HINTERRADNABE — HÁTSÓHID ÉS HÁTSÓ KERÉKAGY				
-	31L.033.00	Rear axle casing assy — Hinterachshülse, zusammenmontiert — Hátsó tengelyháza 0,6.	1	
1	31L.033.762.m	Rear axle casing — Hinterachsbrücke — Hátsó tengelyhid	1	
3	MLC210 20 MS2402-362	Stud — rear axle casing — Stiftschraube sur Hinterachsbrücke — Ássokosvar a hátsótengely hidhoz	16	
4	ML0 MSs 2210	Lock washer — Federring — Rngós alátét	16	
5	ML0 MSs 2260-68	Hexagon nut — Sechskantmutter, blank — Hatlappu z. anya	18	
6	10x14 MSs 2218	Dowel pin — Pasztift — Illesztőeszköz	1	

1	2	3	4	5
7	380.9.33.78	Air-vent screw, complete — Komplettes Einführungsgestänge — Szellőző sze- varzat teljes	2	
8	413.9.15.21	Flanged end screw — cover — Verschluss- schraube zum Abschlusssteckel — Fe- rrases zárósavar a Fedélhez	1	
9	838x44 ABEM MSz 1876	Sealing ring — Simerring — Tűtítő- gyűrű	2	
10	270.0.33.38	Drain plug — Ablassstift — Leeres- tósavar	1	
	380.9.34.311	Rear wheel hub complete LH — Zusam- menmontierte linke Hinterradnabe — Bal hátsó kerékagy S.4.	1	
	380.9.34.312	Rear wheel hub, complete RH — Zusam- menmontierte rechte Hinterradnabe — Jobb hátsó kerékagy S.4.	1	
11	380.9.34.100	Rear wheel hub — Hinterradnabe — Há- tsó kerékagy	2	
12	380.9.34.310	Rear wheel bolt LH — Linker Radbolzen zur Hinterradnabe — Bal keréksavar a hátsó kerékagyhoz	8	
13	380.9.34.280	Rear wheel bolt RH — Rechter Radbolzen zur Hinterradnabe — Jobb keréksa- var a hátsó kerékagyhoz	8	

1	2	3	4	5
14	M20x1,5 MSz 2290-65	Hexagon nut — Sechskantmutter, blank — Hatlapu f. anya	16	
15	20 bal MSz 6472-6E	Wheel nut to item 12 — Radbolzenmutter zum Posten 12 — Kerékanya a 12 té- telhez	8	
16	20 MSz 6472- 6E	Wheel nut to item 13 — Radbolzenmutter zum Posten 13 — Kerékanya a 13 té- telhez	8	
17	380.9.34.99	Stud — rear wheel hub — Stiftschraube zur Hinterradnabe — Saegosavar a hátsó kerékagyhoz	20	
18	M14 MSz 2210 MSz 1875	Lock washer — Federring — Rugós a- láték	20	
19	380.1.47.12	Hexagon nut — Sechskantmutter, blank — Hatlapu f. anya	20	
20	380.1.47.12	Dowel pin — rear wheel hub — Passtift zur Hinterradnabe — Illesztőcsiga a hátsó kerékagyhoz	4	
21	170.0.34.34	Grooved nut, LH — rear axle end — Nut- mutter zum linken Achsenende — Hor- nyos anya bal, a hátsó tengely végre	1	
22	170.0.34.33	Grooved nut, RH — rear axle end — Nut- mutter zum rechten Achsenende — Hor- nyos anya jobb hátsó tengelyvégre	1	

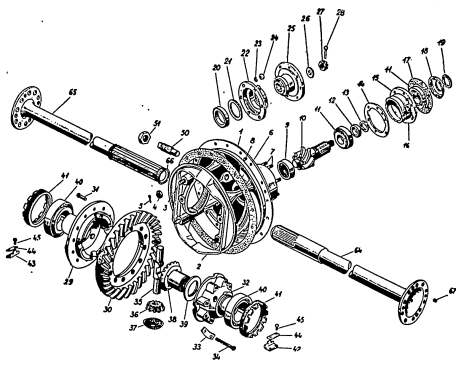
1	2	3	4	5
23	170.0.34.36	Shim, 0,4 mm - roller bearing -- Ein- stellzscheibe zum Rollenlager 0,4 mm -- Beállítótárcsa a görgőcsapágyhoz 0,4 mm	sz/sz	
23	170.0.34.36	Shim, 0,2 mm - roller bearing -- Ein- stellzscheibe zum Rollenlager 0,2 mm -- Beállítótárcsa a görgőcsapágyhoz 0,2 mm	sz/sz	
23	170.0.34.36	Shim, 1 mm - roller bearing -- Einstell- scheibe zum Rollenlager 1 mm -- Be- állítótárcsa a görgőcsapágyhoz 1 mm	sz/sz	
23	170.0.34.36	Shim 1,5 mm - roller bearing -- Ein- stellzscheibe zum Rollenlager 1,5 mm -- Beállítótárcsa a görgőcsapágyhoz 1,5 mm	sz/sz	
23	170.0.34.36	Shim, 0,1 mm - roller bearing -- Ein- stellzscheibe zum Rollenlager 0,1 mm -- Beállítótárcsa a görgőcsapágyhoz 0,1 mm	sz/sz	
24	170.0.34.61	Lock plate -- Sicherungsblech -- Biz- tosító lemez	2	
25	170.0.34.35	Spacer ring -- Zwischenring zum Lager -- Kösbetétgyűrű a csapágyakhoz	2	
26	30215 M8x7302	Taper roller bearing -- Kegellrollenla- ger -- Kúpgörgőcsapágy	2	

1	2	3	4	5
27	380.9.34.133	Spacer sleeve - wheel hub -- Distans- ring zur Radnabe -- Távtartó hüvely a kerékagyba	2	
28	M8x 7322 3226	Taper roller bearing -- Kegellrollenla- ger -- Kúpgörgőcsapágy	2	
29	380.9.34.36	Spacer ring - bearing -- Zwischenring zum Lager -- Kösbetétgyűrű a csapágy- hoz	2	
30	380.9.34.36	Gasket - flanged ring -- Dichtung zum Flanschring -- Tömítés a peremgyűrű- höz	2	
31	380.9.34.132	Flanged ring - rear wheel hub -- Flansch- ring zur Hinterradnabe -- Perem- gyűrű a hátsó kerékagyhoz	2	
32	115x140x13 M8x 7897	Sealing ring with rubber sleeve -- Dich- tungerring mit Gummistülpe -- Gumikar- mantlus tömítőgyűrű	2	
33	380.9.34.169	Gasket - oil pan -- Dichtung zum Ölfän- ger -- Tömítés az olajfogó edényhez	2	
34	380.9.34.165	Oil pan, complete -- Komplettes Ölfän- gergefäß -- Olajfogó edény teljes	2	
35	380.9.34.175	Rubber hose - oil pan -- Gummischlauch zum Ölfängergefäß -- Gumicső az olajfogó edényhez	2	

1	2	3	4	5
36	M10x25 MS 2463-86	Hexagon bolt, threaded to the head — Szokantacschrábe, blank, mit Vollge- winde — Hatlapfejű tövigenetes f. csavar	16	
37	M10 MSx 2210	Lock washer — Federring — Rugó alátét	16	
38	380.9.34.134	Metal ring to the bearing — Metallring sur Lagerung — Fémgűrű a csapágy- záshoz	2	
39	380.9.34.171	Oil-retainer ring to the sliding ring of the rear wheel hub — Olfangring a Gleitring der Hinterradnabe — Olaj- fogógűrű a hátsó kerekágy oszós gyű- rűjéhez	2	
40	380.9.34.28. 28	Sealing ring in the flange — Dichtungs- ring in Stützring — Tömítógűrű a támgűrűben	2	

L—XVI.

Rear axle casing, differential gear and
axle shafts
Hinterachsgehäuse, Ausgleichgetriebe und
Hinterachswellen
Hátsó tengelyház, kiegyenlítőmű és hátsó fél-
tengelyek



L-XVI.

Fig. No. / Ábra Sz.	Description / Beszámolás / Megnevezés	Qc. St. / db.	Remarks / Bemerkung / Megjegyzés
1	3	4	5
REAR AXLE CASING, DIFFERENTIAL GEAR AND SHAFTS — HINTERACHSGEHÄUSE, AUSGLEICHGETRIEBE UND HINTERACHSEN — HÁTSÓ TENGELYHÁZ, KIRGYNLIKŰMŰ ÉS HÁTSÓ FELTENGELYEK			
-	31L.0.32.00R.1	Rear axle casing assy — Zusammenmontierte Hinterachsblocke — Hátsóház C.S.	1
-	31L.0.32.01R.1	Differential gear assy — Zusammenmontiertes Ausgleichgetriebe — Kirgynlikűmű C.S.	1
-	450.0.32.04R.1	Rear axle casing complete — Hinterachsgehäuse komplett — Hátsótengelyház teljes	1
1	380.9.32.04	Rear axle casing — Hinterachsgehäuse — Hátsótengelyház	1
2	380.9.32.172	Bearing block to the rear axle casing — Lagerblöcke zum Hinterachsgehäuse — Csapágyház a hátsótengelyházhoz	1
3	M 16x1.5x130 S DIN939 m 8 G	Stud — Stiftschraube — Ászokosavar	4

1	2	3	4	5
4	M 16x1,5 MSz 2294 68	Fine-threaded castellated nut -- Kronmutter, blank mit Feingwinde -- Pinnommentü korondás 7. anyra	4	
5	4x35 MSz 2224	Cotter pin -- Splint -- Saszeg	4	
6	Gy. 380,9,32, 100	Gasket - axle casing -- Dichtung zum Hinterachengehäuse -- Tömítés a hátsó tengelyházhoz	1	
7	M10x45 MSz 2402-8	Stud -- Stiftschraube -- Ásokosavar	6	
8	Sz20 MSz 2218	Dowel pin -- Passtift -- Illesztőszeg	2	
9	M 2207 DIN 5412	Roller bearing - driving pinion -- Zylinderrollenlager zum Antrieb-Kegelrad -- Hengerörgős csapágy a meghajtó kupkerékhez	1	
10	450,0,32,17	Driving pinion for 7:36 ratio, to be replaced only together with crown wheel 450,0,32,55 / Öberlikon toothing / Antriebskegelrad mit Untersetzung 7/36, kann nur samt Teilerad 450,0,32,55 ausgetauscht werden / Öberlikon-Versahnung / — Hajtókupkerék 7/30 áttétel- hez csak a 450,0,32,55 táánykerékkel együtt cserélhető / Öberlikon fogazás /	1	
10-1	450,0,32,105	Driving pinion for 7:41 ratio, to be replaced only together with crown wheel 450,0,32,106 / Öberlikon toothing /	1	

1	2	3	4	5
11	31310 MSz 7313	Antrieb-Kegelrad mit Untersetzung 7/41 kann nur samt Teilerad 450,0,32,106 ausgetauscht werden / Öberlikon-Versahnung / — Hajtókupkerék 7/41 áttétel- hez csak a 450,0,32,106 táánykerékkel együtt cserélhető / Öberlikon fogazás /	2	
12	180,032,188	Taper roller radial bearing to the driving bevel pinion -- Ringkegelrollenlager zum Antrieb-Kegelrad -- Gyűrűskup- görgőcsapágy a meghajtó kupkerékhez	1	
12	180,032,188	Spacer to taper roller bearing -- Zwischenstück zum Kegelrollenlager -- Közvetítődarab a kupgörgőcsapágyhoz	1	
13	380,9,32,183	Shim, 0,75 mm - driving bevel pinion -- Einstellscheibe zum Antrieb-Kegelrad 0,75 mm -- Beállítótarcsa a hajtókup- kerékhez 0,75 mm	sz/sz	
13	380,9,32,183	Shim, 0,8 mm - driving bevel pinion -- Einstellscheibe zum Antrieb-Kegelrad 0,8 mm -- Beállítótarcsa a hajtókup- kerékhez 0,8 mm	sz/sz	
13	380,9,32,184	Shim, 1 mm - driving bevel pinion -- Einstellscheibe zum Antrieb-Kegelrad 1 mm -- Beállítótarcsa a hajtókup- kerékhez 1 mm	sz/sz	
13	380,9,32,185	Shim, 0,1 mm - driving bevel pinion -- Einstellscheibe zum Antrieb-Kegelrad	sz/sz	

1	2	3	4	5
		0,1 m/m -- Beállítótárcsa a hajtókup- kerékhez [0,1 mm		
13	380.9.32.186	Shim, 0,15 mm - driving bevel pinion -- Einstellscheibe zum Antrieb -Kegelrad 0,15 m/m -- Beállítótárcsa a hajtókup- kerékhez 0,15	sz/ss	
13	380.9.32.187	Shim, 0,4 mm - driving bevel pinion -- Einstellscheibe zum Antrieb -Kegelrad 0,4 m/m -- Beállítótárcsa a hajtókup- kerékhez 0,4 mm	sz/ss	
14	380.9.32.178	Shim, 0,1 mm -- Einstellscheibe 0,1m/m -- Beállítótárcsa 0,1 mm	sz/ss	
14	380.9.32.179	Shim, 0,15 mm -- Einstellscheibe 0,15m/m -- Beállítótárcsa 0,15 mm	sz/ss	
14	380.9.32.180	Shim, 0,4 mm -- Einstellscheibe 0,4m/m -- Beállítótárcsa 0,4 mm	sz/ss	
14	380.9.32.181	Shim, 1 mm -- Einstellscheibe 1 m/m -- Beállítótárcsa 1 mm	sz/ss	
15	380.9.32.177	Bearing bush -- Lagerbüchse -- Csap- ágyasely	1	
16	6x16 MSs 2220	Set pin - bearing bush -- Feststello- stift zur Lagerbüchse -- Rögzítőesze a csapágyaselyhez	1	

1	2	3	4	5
17	380.9.32.194	Gasket - bearing bush -- Dichtung zur Lagerbüchse -- Tömítés a csapágyas- elyhez	1	
18	450.0.32.51	Oil return baffle between the coupling hub and the taper roller bearing -- Öl- schleuderring zwischen Schaltnabe und Kegelrollenlager -- Olajszórótárcsa a kapcsolóház és a kúpgörgős csapágy közé	1	
19	450.032.52	Gasket -- Dichtung -- Tömítés	1	
20	60x80x12 MSs 7897	Flanged sealing ring - end cover -- Dich- tungerring -- Kérmantyas tömítőgyűrű a zárófedélhez	1	
21	380.9.21.05	Felt ring - end wovel -- Filzring zum Abschlussdeckel -- Hőszigetelő a zá- rófedélhez	1	
22	380.9.32.176	End cover to taper roller bearing -- Abschlussdeckel zum Kegelrollenlager -- Zárófedél a kúpgörgős csapágyhoz	1	
23	M10 MSs 2210	Lock washer -- Federring -- Rugós a- lédét	6	
24	M10 MSs 2260-68	Hexagon nut -- Sechskantmutter, blank -- Hatlapu f. anya	6	
25	380.25.15	Dog hub, complete -- Klauenabe komplett	1	

1	2	3	4	5
26	180.0.32.140	--- Körrege egy talján Spacer ring - driving bevel pinion --- Beilagrung zum Antriebskegelrad --- --- Kősbetétgyűrű a hajtókupkerékhez	1	
27	M24x1.5 MSz 2292-68	Fine-threaded flat castellated nut --- --- Finommenetű alacsony koronás a. --- Flache Kronmutter mit Feingewinde	1	
28	5x45 MSz 2224	Cotter pin --- Splint --- Saszeg	1	
-	-	Differential gear casing half with flange, assembly consisting of items 29 to 32 --- Die zusammenmontierte Hälfte des Ausschleissgehäuses besteht aus den Positionen 29-32 --- Kiegészítő tárház felét összerakva ill. a 29-... 32 tételeből	1	
-	31L.932.173rn	Zusammenmontierte Hälfte des Ausgleich- getriebe-Gehäuses aus den Positionen 29-31 --- Kiegészítőháza két param- mel összerakás ill. a 29... 31 tétel- ből	1	
29	31L.9.32.170	Differential gear casing half with flange --- Ausgleichgetriebe-Gehäusehälfte mit Flansch --- Kiegészítőháza fél paramé	1	

1	2	3	4	5
30	450.0.32.55	Crown wheel for 7/36 ratio; to be repla- ced only together with driving bevel pinion 450.0.32.17 /Oerlikon tooth- ing/ --- Tellerad mit Unterstang 7/36, kann nur mit Antriebskegelrad 450, 0.32.17 ausgetauscht werden. /Oerlikon-Versahnung/ --- Tányérkerék 7/36 áttételhez csak a 450.0.32.17 haj- tókupkerékkel együtt cserélhető /Oerlikon fogazás/	1	
30-1	450.0.32.106	Crown wheel for 7/41 ratio; to be repla- ced only together with driving bevel pinion 450.0.32.105 /Oerlikon tooth- ing/ --- Tellerad mit Unterstang 7/41 kann nur samt Antriebskegelrad 450.0.32.105 ausgetauscht werden. /Oerlikon-Versahnung/ --- Tányérkerék 7/41 áttételhez csak a 450.0.32.105 hajtókupkerékkel együtt cserélhető /Oerlikon fogazás/	1	
31	380.9.32.205	Rivet - crown wheel --- Niet zum Teller- rad --- Sasgecs a tányérkerékhez	12	
32	380.9.32.154	Differential gear casing half --- Halbes Ausgleichgehäuse --- Kiegészítőháza fél	1	
33	450.0.32.60	Lock plate --- Sicherungsblech --- His- tőtálcács	4	

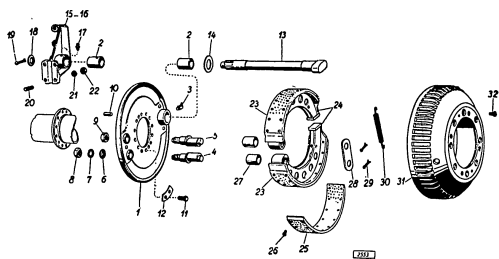
1	2	3	4	5
34	M4x1,5x80 MSz 2490-80	Fine-pitch bolt — Schraube mit Feingewinde — Finommenetű csavar	8	
35	180.0.32.16	Spindle — differential pinion — Welle zum Ausgleichkegelrad — Tengely a kiegyenlítő kupkerékhez	2	
36	180.0.32.14	Planetary pinion — Kleines Ausgleichkegelrad — Kis kiegyenlítő kupkerék	4	
37	180.0.32.15	Spacer — planetary pinion — Zwischenplatte zum kleinen Ausgleichkegelrad — Közvetítőlemez a kis kiegyenlítő kupkerékhez	4	
38	380.9.32.141	Differential pinion — Grosses Ausgleichkegelrad — Nagy kiegyenlítő kupkerék	2	
39	180.0.32.12	Spacer to the differential pinion 5 mm — Zwischenbohle zum grossen Ausgleichkegelrad 5 m/m — Közvetítőlemez a nagy kiegyenlítő kupkerékhez 5 mm	sz/sz	
39	180.0.32.131	Spacer to the differential pinion 5,2 mm — Zwischenbohle zum grossen Ausgleichkegelrad 5,2 m/m — Közvetítőlemez a nagy kiegyenlítő kupkerékhez 5,2 mm	sz/sz	
39	180.0.32.132	Spacer to the differential pinion 5,3 mm — Zwischenbohle zum grossen Ausgleichkegelrad 5,3 m/m — Közvetítőlemez a	sz/sz	

1	2	3	4	5
39	180.9.32.169	nagy kiegyenlítő kupkerékhez 5,3 mm Spacer to the differential pinion 4,9 mm — Zwischenbohle zum grossen Ausgleichkegelrad 4,9 m/m — Közvetítőlemez a nagy kiegyenlítő kupkerékhez 4,9 mm		Sz/sz
40	32216 MSz 7322	Taper roller bearing — differential housing — Kegelrollenlager zum halben Ausgleichgetriebe-Gehäuse — Kugörgörög csavár a kiegyenlítőházhoz	2	
41	380.9.32.159	Threaded ring — differential housing — Gewändering zum Ausgleichgetriebe-Gehäuse — Menetgyűrű a kiegyenlítőházhoz	2	
42	380.9.32.160	Lock strap — threaded ring — Sicherungsblech zum Gewändering — Biztosító kegyel a menetgyűrűhöz	1	
43	380.9.32.171	Lock strap — threaded ring — Sicherungsblech zum Gewändering — Biztosító kegyel a menetgyűrűhöz	1	
44	380.9.32.161	Lock plate — Sicherungsblech — Biztosító lemez	2	
45	M6x15 MSz 2463-80	Hexagon bolt, threaded to the head — Sechskantschraube, blank, mit Vollgewinde — Hatlapfejű tövigenetes f. csavar		4

1	2	3	4	5
50	380.9.32.126	Thrust stud - crown wheel -- Auslegeschraube zum Fellergrad -- Hítámasszóosavar a tányérkerékhez	1	
51	M24x1.5 MS2291-68	Flat nut -- Flachmutter, blank -- A laosony fényes anyja	1	
64	380.9.34.326	Rear axle shaft, RH -- Rechte Hinterachswelle -- Hátsó féltengely jobb	1	
65	380.9.34.327	Rear axle shaft LH -- Linke Hinterachswelle -- Hátsó féltengely bal	1	
66	50 DIN 9045	Thrust ring -- Spannring -- Feszítőgyűrű	1	
67	M10x12 MSx 2422-68	Set screw to the axle shafts -- Gewindestift zur den Achswellen -- Hernyóosavar a tengelyfelekhez	4	

L-XVII.

Rear wheel brake
Hinterradbremse
Hátsó kerékfék



L-XVII.

Fig. No. / Abb. / Ábra	No. / Sz.	Description / Benennung / Megnevezés	Pc. / St. / db.	Remarks / Bemerkung / Megjegyzés
REAR WHEEL BRAKE — HINTERRADBREMSZE — HÁTSÓ KERÉKFÉK				
-	41L.O.34.00R	Rear wheel brake assy. RH — Rechte Hinterradbremse; montiert — Hátsó kerékfék 0.4. jobb	1	
-	41L.O.34.0L	Rear wheel brake assy. LH — Linke Hinterradbremse; montiert — Hátsó kerékfék 0.4. bal	1	
-	450.O.34.03	Brake cover plate assy., consisting of items 1 to 3 — Komplettes Bremsabdeckblech; besteht aus Position 1—3 — Hátsó féktakarólemez teljes áll., 1...3 tételeiből	2	
1	450.O.34.04 450.O.34.05	Brake cover plate welded to the brake support — Bremsabdeckblech mit Bremsträger aus. geschweiselt — Féktakaró lemez féktakaróval összehegesztve	2	

Fig. No. / Abb. Nr.	No. / Nr.	Description / Benennung / Megnevezés	Qc. / St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
REAR WHEEL BRAKE — HINTERRADBREMS — HÁTSÓ KERÉKPÁR				
-	51L.0.34.00R	Rear wheel brake assy. RH — Rechte Hinterradbremse, montiert — Hátsó kerékpár 0.4. jobb	1	
-	51L.0.34.01	Rear wheel brake assy. LH — Linke Hinterradbremse, montiert — Hátsó kerékpár 0.4. bal	1	
-	450.0.34.03 450.0.34.03	Brake cover plate assy., consisting of 1-3 parts 1 to 3 — Komplettes Bremsabdeckblech, besteht aus Position 1-3 — Hátsó féktakarólemez teljes áll. 1...3 tételeiből	2	
1	450.0.34.04 450.0.34.05	Brake cover plate welded to the brake support — Bremsabdeckblech mit Bremsträger aus, geschweiselt — Féktakaró lemez féktakaróval összehegesztve	2	

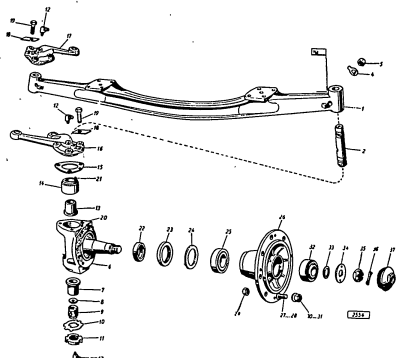
1	2	3	4	5
2	400.0,34,34	Brush - Hírház - Persely	4	Two pieces to
3	0. B-MX1 - MS513	Grease nipple - Druckschmierknopf mit Kugel - Golyós zsírozógomb	2	item 1, two pieces to item 16
4	450.0,44,11	Eccentric pin - Excenterbolzen - Excenterosap	2	28t. su 1 und 35t. 2 8t. su 1 und 16
5	450.0,44,12	Eccentric pin lefthanded - Excenterbolzen linksgängig - Excenterosap balsoneti	2	2 8t. 1-hoz 15 és 2 db. 16-hoz
6	450.0,44,13	Washer - eccentric pin - Unterlagsscheibe zum Excenterbolzen - Alátét az excenterosaphoz	4	
7	M24 MSs 2210	Lock washer - Federring - Rugós Alátét	4	
8	M24x1.5 MSs 2290-69	Hexagon nut - Sechskantmutter, blank - Hatlapú f. anya	2	
9	M24x1.5 bal MSs 2290-69	Hexagon nut - Sechskantmutter, blank - Hatlapú f. anya	2	
10	1/2x24 MSs 2218	Dowel pin - brake cover plate - Feszítőcsig a féktakaró lemezhez	4	
11	450.0,34,124	Pin-threaded hexagon bolt - Sechskantschraube mit Fingerring - Hatlapú fűtűmenetű csavar	24	
12	380.1,34,64	Lock plate - Sicherungsblech - Biztosítólemez	12	
13	450.0,34,28	Rear brake cam - Hinterer Bremskeil - Hátdét fékkulcs	2	
14	400.0,44,30	Washer - Unterlagsscheibe zum Bremskeil - Alátét a fékkulchoz	1	
-	31L.0,34,47	Bracket RH - rear air brake, complete,	1	

1	2	3	4	5
-	31L.0,34,48	consisting of items 16 and 2 - Komplette Konsole zur rechten, hinteren Luftbremse, besteht aus Position 16 und 2 - Konzol a hátdét légfékhez teljes jobb old. a 16 és 2 tételből	1	
-	31L.0,34,48	Bracket LH, for the rear air brake, complete, consisting of items 15 and 2 - Komplette Konsole zur linken, hinteren Luftbremse, besteht aus Position 15 und 2 - Konzol a hátdét légfékhez teljes bal old. a 15 és 2 tételből	1	
15	31L.0,34,50R	Bracket LH - rear air brake - Konsole zur hinteren Luftbremse, links - Konzol a hátdét légfékhez bal	1	
16	31L.0,34,49 L	Bracket RH - rear air brake - Konsole zur hinteren Luftbremse, rechts - Konzol a hátdét légfékhez jobb	1	
17	GA-MX1 MS513	Grease nipple - Druckschmierknopf mit Kugel - Golyós zsírozógomb	1	
18	400.0,44,46	Washer - brake cam lever - Unterlage zum Lenkarm - Alátét a mozgató karhoz	2	
19	5x40 MSs 2224	Cotter pin - Splint - Saszeg	2	
20	M12x25 MSs 2402	Stud - Stiftschraube - Ásokcsavar	8	
21	M12 MSs 2210	Lock washer - Federring - Rugós alátét	8	
22	M12 MSs 2260	Hexagon nut - Sechskantmutter, blank - Hatlapú f. anya	8	

1	2	3	4	5
23	450.0.44.32	Brake shoe with 127° lining, complete, consisting of 24 to 27 items — Komp. Lette Bremsbacke 127° mit Belag, Be- schlag zum Positionieren 27 — Székcsipa 127°-os betéttel teljes, ill a 24..27 tét.-ből	4	
24	450.0.44.19	Welded brake shoe without lining c/w item 27 — Geschweisste Bremsbacke ohne Belag, Komplet mit Position 27 — Ragasztott fékpáncsa székcsipét nélkül tel- jes a 27-téttel	4	
25	450.0.44.25	Brake lining, 127° — Bremsbelag 127° — Fékbetét 127°	4	
26	6x20 DIN I. 175	Countersunk rivet — Niet — Sullyessz tettejű szegecs	72	
27	450.0.44.23	Rush — brake shoe — Büchse zur Brems- backe — Párnely a fékpáncsra	4	
28	450.0.44.16	Strap to the eccentric pins — Lasche an den Exzenterscheiben — Havezér az excentersapkához	2	
29	4x40 MSz. 2224	Cotter pin — Splint — Sakszeg	4	
30	400.0.44.27	Brake shoe return spring — Rückholfre- der zur Bremsbacke — Visszahúzórugó a fékpáncsra	4	
31	450.0.34.46	Rear brake drum — Hintere Bremsstrommel — Hátsó fékdob	2	
32	450.0.34.89	Countersunk screw — Sankschraube — Sullyesztettejű csavar	8	

L—XVIII.

Front axle ball joint and wheel hubs
Vorderes Wellengelenk und Vorderradnabe
Mellső tengelycsukló és kerékagy



L-XVIII.

Fig. No. / Ábra Sz.	Description / Beműneung / Megnevezés	Qc. St. / db.	Remarks / Beműrkuung / Megjegyzés
1	FRONT AXLE BALL JOINT AND WHEEL HUBS -- VORDERER ACHSENSTWPF UND VORDERRADNABE -- MELLŐ TENGELYCSUKLÓ ÉS KERÉKAGY	4	5
-	Front axle ball joint and wheel hub assembly -- Vorderer Achsenstumpf und Radnabe, zusammengesetzt -- Mellső tengelycsukló és kerékagy Ö.é.	1	
- 450.0.41.59	Front axle with pivot pin, complete -- Komplette Vorderachse mit Achsenkellenbolzen -- Mellső tengelyállósappal teljes	1	
1 450.0.41.02	Front axle -- Vorderachse -- Mellső-tengely	1	
2 4454-9-39	Pivot pin - ball joint -- Achsenkellenbolzen zur Achsenstumpf -- Állósapp a tengelycsuklóhoz	2	
3 1454-9-33	Key bolt -- Keilschraube -- Ékescsavar	2	
4 1454-9-35	Lock plate -- Sicherungsblech -- Biz-	2	

1	2	3	4	5
		tosítólesek		
5	1A54-9-34	Nut -- Schraubenmutter -- Csavaranya	2	
-	450.0.41.06	Ball joint and lower bush assy, consisting of items 6 and 7 -- Komplettes Achsengelenk mit unterer Nische, besteht aus Position 6u7 -- Tengelycsukló alsópersellyel teljes All a 6 és 7 részéből	2	
6	450.0.41.07	Ball joint -- Achsengelenk -- Tengelycsukló	2	
7	1A54-9-27	Lower bush -- Untere Nische -- Alsó persely	2	
8	1A54-9-29	Thrust washer -- Drucklinse -- Nyomólemez	2	
9	1A54-9-31	Adjusting screw -- Einstellschraube -- Beállító csavar	2	
10	1A54-9-30	Lock plate -- Sicherungsblech -- Biztosító lemez	2	
11	1A54-9-38	Lock nut -- Sicherungsmutter -- Ellenanya	2	
12	00-MSX1 MSa 313	Grease nipple -- Druckschmierknopf mit Kugel -- Gyútyó csatlósugár	4	

1	2	3	4	5
-	450.0.41.16	Upper ball joint with upper bush, complete consisting of items 13 and 14 -- Komplette obere Wellengetriebnische mit oberer Nische, besteht aus Position 13, und 14 -- Felső tengelycsukló persely felső persellyel teljes All 13...14 részéből	2	
13	1A54-9-28	Upper bush -- Obere Nische -- Felső persely	2	
14	1A54-9-32	Bush, upper - ball joint -- Obere Achsenstumpfnische -- Felső tengelycsukló persely	2	
15	170.0.41.51	Shim - ball joint -- Einstellplatte zum -- Beállítólemez a tengelycsuklóhoz	sz/sz	
15	170.0.41.70	Shim, 0,4 mm - ball joint - Einstellplatte zum 0,4 mm -- Beállítólemez a tengelycsuklóhoz 0,4 mm	sz/sz	
15	170.0.41.76	Shim, 1 mm 0,2 mm - ball joint -- Einstellplatte zum 0,2 mm -- Beállítólemez a tengelycsuklóhoz 1 mm 0,2 mm	sz/sz	
15	170.0.41.92	Shim, 0,1 mm - ball joint -- Einstellplatte zum 0,1 mm -- Beállítólemez a tengelycsuklóhoz 0,1 mm	sz/sz	
16	2A54-9-36/1	Steering arm -- Lenkspurnebel -- I-rányú csatlósugár	1	

1	2	3	4	5
		toaitóleses		
5	1A54-9-34	Nut -- Schraubenmutter -- Csavaranya	2	
-	450.0.41.08	Ball joint and lower bush assy, consisting of items 6 and 7 -- Komplettes Achsaengelenk mit unterer Nische, besteht aus Position 6/7 -- Tengelycsukló alsó persellyel teljes Áll a 6 és 7 tételből	2	
6	450.0.41.07	Ball joint -- Achsaengelenk -- Tengelycsukló	2	
7	1A54-9-27	Lower bush -- Untere Nische -- Alsó persely	2	
8	1A54-9-29	Thrust washer -- Drucklinea -- Nyomólemez	2	
9	1A54-9-31	Adjusting screw -- Einstellschraube -- Beállító csavar	2	
10	1A54-9-30	Lock plate -- Sicherungsblech -- Biztosító lemez	2	
11	1A54-9-38	Lock nut -- Sicherungsmutter -- Ellenanya	2	
12	00-MSx1 MSx 513	Grease nipple -- Drucktechnikknopf mit Kugel -- Golyós zsírszögomb	4	

1	2	3	4	5
-	450.0.41.16	Upper ball joint with upper bush, complete consisting of items 13 and 14 -- Komplette obere Wellengehenkbüchse mit oberer Nische, besteht aus Position 13. und 14. -- Felső tengelycsukló felső persellyel teljes Áll 13....14 tételből	2	
13	1A54-9-28	Upper bush -- Obere Nische -- Felső persely	2	
14	1A54-9-32	Bush, upper -- ball joint -- Obere Achsenstumpbüchse -- Felső tengelycsukló persely	2	
15	170.0.41.51	Shim - ball joint -- Einstellplatte sum 0,4 mm -- Beállítólemez a tengelycsuklóhoz	sz/sz	
15	170.0.41.70	Shim, 0,4 mm - ball joint -- Einstellplatte sum 0,4 mm -- Beállítólemez a tengelycsuklóhoz 0,4 mm	sz/sz	
15	170.0.41.76	Shim, 1 mm 0,2 mm - ball joint -- Einstellplatte sum 0,2 mm -- Beállítólemez a tengelycsuklóhoz 1 mm 0,2 mm	sz/sz	
15	170.0.41.92	Shim, 0,1 mm - ball joint -- Einstellplatte sum 0,1 mm -- Beállítólemez a tengelycsuklóhoz 0,1 mm	sz/sz	
16	2A54-9-36/1	Steering arm -- Lenkepurhebel -- Irdányú nyújtókar	1	

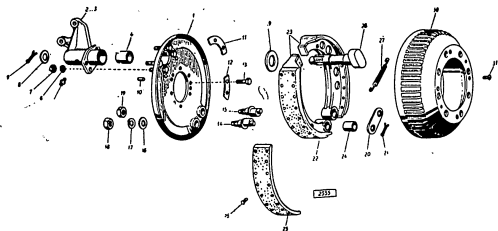
1	2	3	4	5
17	2A54-9-37/1	frack arm -- Spurhebel -- Fyostdvkar	1	
18	380.9.41.35	Lock plate -- Sicherungsblech -- Biztosító lemez	6	
19	M14x1.5x35 MSs 2490-80	Fine threaded bolt -- Schraube mit Feingewinde -- Finommenetű csavar	6	
20	18x20 MSs 2218	Dowel pin -- Pasztift -- Illesztőszeg	2	
21	8x24 MSs 2218	Dowel pin -- Pasztift -- Illesztőszeg	2	
22	170.0.41.87	Insert ring -- ball joint -- Beilagering -- Belsőgyűrű a tengelyosáklóhoz	2	
23	75x100x12 MSs 7897	Rubber flanged sealing ring -- Dichtungering mit Gummistulpe -- Gumikarmanytus tömítőgyűrű	2	
24	170.0.41.42	Spacer plate -- Zwischenplatte -- Közvetítőlap	2	
25	32211 MSs 7528	Taper roller bearing -- Kegeltrollenlager -- Kúpgörgőcsapágy	2	
-	380.9.41.89	Front wheel hub RH, complete, consisting of items 26, 27 and 29 -- Linke Vorderradnabe, komplett, Besteht aus Positionen 26, 27 und 29 -- Ball mellőző kerékagy teljes áll: 26, 27 és 29 tá- telből	1	

1	2	3	4	5
-	380.9.41.90	Front wheel hub RH, complete, consisting of items 26, 27 and 29 -- Rechte Vorderradnabe, komplett, Besteht aus Positionen 26, 27 und 29 -- Jobb mellőző kerékagy teljes áll: 26, 27 és 29 tá- telből	1	
26	380.9.41.91	Front wheel hub -- Vorderradnabe -- Belső kerékagy	2	
27	380.9.41.69	Front wheel bolt, left handed -- Linker Radbolts -- Bal kerékesavar	8	
28	380.9.41.70	Front wheel bolt, right handed -- Rechter Radbolts -- Jobb kerékesavar	8	
29	M20x1,5 MSs 2290-68	Hexagon nut -- Sechskantmutter, blank -- Hatlapú f. anya	16	
30	20 bal #8 MSs 6472-69	Wheel nut -- Radboltsmutter -- Kerék- anya	8	
31	20 MSs6472-6E	Wheel nut -- Radboltsmutter -- Kerék- anya	8	
32	32308 MSs 7523	Taper roller bearing -- Kegeltrollenlager -- Kúpgörgőcsapágy	2	
33	380.9.41.43	Shim 0.1 mm -- bearing -- Einstellscheibe aus Lager, 0,1 mm -- Beállítólemez a csapágyhoz 0,1 mm	sz/az	
33	380.9.41.43	Shim 0.4 mm -- bearing -- Einstellscheibe	sz/az	

1	2	3	4	5
		be zum Lager, 0,4 m/m -- Beállító- lemez a csapágyhoz 0,4 mm	sz/az	
33	170.0.41.89	Shim, 0,2 mm - bearing -- Einstellschei- be zum Lager, 0,2 m/m -- Beállító- lemez a csapágyhoz 0,2 mm	sz/az	
33	170.0.41.90	Shim, 1 mm - bearing -- Einstellscheibe zum Lager, 1, m/m -- Beállítólemez a csapágyhoz 1 mm	sz/az	
34	380.9.41.87	D-washer - ball joint -- D-Scheibe -- D tárcsa a tengelycsuklóhoz	2	
35	M30x1,5 MSx 2892-68	Flat castellated nut -- Flache Kronen- mutter -- Alacsony koronás anya	2	
36	6x60 MSx 2224	Cotter pin -- Splint -- Saszeg	2	
37	380.9.41.72	Dust cap -- Verschlusskappe -- Zár- sapka	2	

L-XIX.

Front wheel brake
Vorderradbremse
Mellső kerékfék



L-XIX.

Fig. No. / Abb. / Ábra	No. / No. / Sz.	Description / Bezeichnung / Megnevezés	Pc. / St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
FRONT WHEEL BRAKE -- VORDERRADBREMSSE -- MELLSŐ KERÉKFÉK				
-	450.0.44.00	Front wheel brake assy, RH -- Zusammenmontierte Vorderradbremse, rechts -- Mellső kerékfék összeszerelés, jobb	1	
-	450.0.44.01	Front wheel brake assy, LH -- Zusammenmontierte Vorderradbremse, links -- Mellső kerékfék összeszerelés, bal	1	
1	450.0.44.03	Front cover plate, complete -- Vorderes Bremsabdeckblech, komplett -- Mellső féktakaró lemez, teljes	2	
-	450.0.44.42	Bracket to front wheel brake LH, complete, consisting of items 4 and 4 -- Konsole zur linken Vorderradbremse, komplett. Besteht aus Position 2 und 4. -- Konzol a mellső kerékfékhez, teljes, bal, áll: 2 és 4 tételből.	1	

1	2	3	4	5
	450.0.44.41	Bracket to front wheel brake RH, complete, consisting of items 3 and 4 -- Konsolje sur rechten Vorderradbremse, Kompletz, besteht aus Position 3 und 4, -- Konsol a mellso kerékfékhez teljes jobb áll: 3 és 4 tételből	1	
2	450.0.44.44	Bracket to front wheel brake LH -- Konsolje sur Vorderradbremse, links -- Konsol a mellso kerékfékhez bal	1	
3	450.0.44.43	Bracket to front wheel brake RH -- Konsolje sur Vorderradbremse, rechts -- Konsol a mellso kerékfékhez, jobb	1	
4	400.044.34	Rush -- front bracket -- Rész a mellso konsolhoz	4	
5	GA-M8x1 MS 513	Grease nipple -- Drukschmierknopf mit Kugel -- Golyós zsírszögomb	2	
6	M12 MS 2210	Lock washer -- Federring -- Rugós alátét	8	
7	M12 MS 2260	Hexagon nut -- Sechskantmutter, blank -- Hatlapu f. anya	8	
8	400.0.44.44	Washer -- brake cam lever -- Unterlage zum Lenkarm -- Alátét a mozgató karhoz	2	

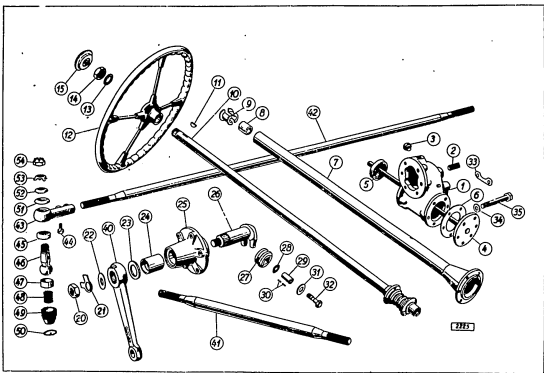
1	2	3	4	5
9	5x40 MS 2224	Cotter pin -- Splint -- Sasszeg	2	
10	13x24 MS 2218	Dowel pin -- brake supporting plate -- Festsift zur Bremsenblech -- Illesztoszeg a féktakaró lemezhez	4	
11	380.1.44.64	Lock plate -- Sicherungsblech -- Biztosító lemez	4	
12	330.1.44.63	Lock plate -- Sicherungsblech -- Biztosító lemez	4	
13	450.0.34.124	Hexagon fine-threaded bolt -- Sechskant-schraube mit Feingewinde -- Hatlapfejű finommenetű csavar	16	
14	450.0.44.11	Eccentric set pin -- Exzenterbolzen	2	
15	450.0.44.12	Eccentric set pin -- Exzenterbolzen, links -- Exzentercsap balra	2	
16	450.0.44.13	Washer -- eccentric set pin -- Unterlage schraube zum Exzenterbolzen -- Alátét az exzentercsaphoz	4	
17	M 24 MS 2210	Lock washer -- Federring -- Rugós alátét	4	
18	MS 2290-68 M24x1,5	Hexagon nut -- Sechskantmutter, blank -- Hatlapu f. anya	2	

1	2	3	4	5
19	M24x1.5 bal. MS 2550-58	Hexagon nut -- Sechskantmutter, blank -- Hatlapu f. anya	2	
20	450.0.44.16	Shap -- eccentric pin -- Lasche zu den Exzenterzapfen -- Heveder az exocen- terezőpókhöz	2	
21	4x40 MS 2224	Cotter pin -- Splint -- Szaszeg	4	
22	450.0.44.32	Brake shoe assy consisting of items 23 to 26 -- Bremsbacke mit 127° Be- lag, kompl. bestehend aus den Positio- nen 23-26 -- Fékpófa 127°-os betéttel, teljes All: 23, 26 tételből	4	
23	450.0.44.19	Brake shoe without lining, complete -- Geschweisste Bremsbacke ohne Bremsbelag, komplett -- Hegesztett fékpófa fókba- tét nélkül, teljes	4	
24	450.0.44.23	Rush - brake shoe -- Hochs zur Brems- backe -- Persely a fékpófához	4	
25	450.0.44.25	Brake lining -- Bremsbelag 127° -- Fók- betét 127°-os	4	
26	6x20 DIN 1175	Rivet countersunk head -- Senkkopfniet -- Süllyesztettfejű csavarr	72	
27	400.0.44.27	Brake shoe return spring -- Rückschfe- der zum Bremsbacke -- Visszahúzó ru- gó a fékpófához	4	

1	2	3	4	5
28	450.0.44.28	Front brake cam -- Vorderer Bremschluß- sel -- Mellés fékkulcs	2	
29	400.0.44.30	Washer -- Unterlage zum Bremschlußsel -- Alátét a fékkulchoz	2	
30	450.0.34.89	Front brake drum -- Vorderer Bremsstrommel -- Mellés fékdob	2	
31	450.0.34.89	Countersung screw -- Senkkopfschraube mit Vollgewinde -- Süllyesztettfejű cs.f. csavar	2	

L-XX.

Steering, track rod, -drag link
Lenkung, Spurstange, Lenkstange
Kormánymű, nyomódrúd, kormánytolórúd



L-XX.

Fig. No. / Abb. / Ábra	No. / No. / Sz.	Description / Beméneung / Megnevezés	Qc. / St. / db.	Remarks / Beméneung / Megjegyzés
1	2	3	4	5
STEERING, TRACK ROD, DRAG LINK — LENKUNG, SPURSTANGE LENKSTANGE — KORMÁNYRUD, NYOMTÁVTRUD, KORMÁNYTÖLÉRUD				
-	2A54-11-13	Steering, complete — Komplette Lenkung — Kormányrud komplett	1	
1	178.0.47.46-1	Steering housing — Komplettes Lenkgehäuse	1	
1a	10z25 a Sz 2402-86	Stud — Stiftschraube zur Befestigung des Lagerflansches und der Lenkskule — Assokosavar a csapágyperem és a kormányoszlop felszereléséhez	9	
1b	380.1.47.68	Stud — Stiftschraube zur Sicherung des Lagerflansches — Assokosavar a csapágyperem biztosításához	2	
1c	380.1.47.82	Stud — Stiftschraube zur Sicherung der Lenkskule — Assokosavar a kormányoszlop biztosításához	1	
1d	10z22 Sz 2402-86	Stud — Stiftschraube zur Befestigung	5	

1	2	3	4	5
		des Deckels -- Ásokosavar a fedél feloldatásához		
1e	380.1.47.81	Stud -- Stiftschraube zur Sicherung des Deckels -- Ásokosavar a fedél biztosításához	1	
1f	380.1.47.12	Dowel pin -- Pasztift a szelvények között -- Illesztőeszköz a kormányhidakhoz	1	
1g	1A54-11-14	Stud -- Stiftschraube zum Lenkgehäuse -- Ásokosavar a kormányházhoz	2	
2	170.047.30	Adjusting screw - steering -- Stellschraube zur Lenkung -- Állítócsavar a kormányhoz	2	
2a	MSA 5 MS 226	Flat nut -- Flachmutter, blank -- Alacsony 2. anyá	2	
3	MSA 5 MS 70802	Flanged oil filler plug screw -- Ölzufüllungs-Ölschraube -- Fereses szárdősevar az olajbetöltéshez	2	
3a	Al4x18 Al MS 18716	Sealing ring -- Dichtungsring -- Tömítőgyűrű	2	
4	170.0.47.29	Cover - steering box, complete -- Kompletter Deckel zum Lenkgehäuse -- Fedél a kormányházhoz, telj.	1	

1	2	3	4	5
4a	M10 MS 2210	Lock washer -- Federring -- Rugós alátét	6	
4b	M10 MS 2260	Hexagon nut -- Sechskantmutter, blank -- Hatlapú 2. anyá	6	
5	30207 MS 7300	Taper roller bearing -- Kegeltrollenlager	2	35x72x18
5a	Gy 380.9.47.100	Shim, 1 mm -- Einstellscheibe zwischen Deckel und Kegeltrollenlager 1 mm -- Beállító tárcsa a fedél és kupporgőcsaspágy között 1 mm	2	Only for bearings deviating from standard design -- Csak a szabványtól eltérő csapágyak esetében szükséges
5a-1	Gy 380.9.47.101	Shim, 0,5 mm -- Einstellscheibe zwischen Deckel und Kegeltrollenlager 0,5 mm -- Beállító tárcsa a fedél és kupporgőcsaspágy között 0,5 mm	2	Only for bearings similar to the standard -- Csak a szabványhoz nem tartozó gének esetében szükséges

1	2	3	4	5
				tén szükséges
6	170.0.47.41	Shim, 0,1 mm -- Einstellscheibe zwischen/az Deckel und Lenkgehäuse, 0,1 mm -- Béltöltőházra a fedél és a kormánytá- hás közé 0,1 mm	sz	nach Bedarf
6-1	170.0.47.26	Shim, 0,5 mm -- Einstellscheibe zwischen/az Deckel und Lenkgehäuse, 0,5 mm -- Be- állítóházra a fedél és a kormánytá- hás közé 0,5 mm	sz	
6-2	170.0.47.26	Shim, 0,2 mm -- Einstellscheibe zwischen Deckel und Lenkgehäuse, 0,2 mm -- Be- állítóházra a fedél és a kormánytá- hás közé 0,2 mm	sz/az	
7	1A54-11-20	Steering column, complete -- Válltá- rás Lenkcsüle -- Kormányoszlop, teljes	1	
7a	WLO MSs 2210	Lock washer -- Federring -- Rugós alá- tét	6	
7b	WLO MSs 2260- 68	Hexagon nut -- Szekszantmutter, blank -- Hatlapp f. anya	6	
8	380.9.47.23	Rubber ring - steering column support -- Gumring zur Lagerung der Lenkcsüle -- Gumigyűrű a kormányoszlop ágyasá- hoz	1	

1	2	3	4	5
9	380.9.47.22	Bearing shell half - steering column bea- ring -- Lagergehälschalen für die La- gerung der Säule -- Gumpfyűrűsfe- lek az oszlop ágyasához	2	
10	1A54-11-35	Steering column o/w worm -- Lenkcsüle mit Lenkcsuhé, komplett. -- Kor- mányoszlop onigával, teljes	1	
11	27,5 DIN 6888	Woodruff key -- Scheibenfeder -- Ives retana	1	
12	422.766	Steering wheel o/w horn push button -- Lenkcsül mit Signalknopf, komplett -- Kormánykerék kúrtygombbal, teljes	1	
13	380.1.47.52	Washer -- Unterlagscheibe -- Alátét	1	
14	M22x1,5 MSs 2291-68	Flat nut -- Flanke Flachmutter -- Ala- csavany Z, anya	1	
15	300.J1-0.174	Horn push button -- Signalknopf -- Kúrtygomb	1	
20	M24x1,5 MSs 2290-68	Hexagon nut -- Szekszantmutter, blank -- Hatlapp f. anya	1	
21	170.0.47.31	Lock plate - steering arm fastening -- Sicherungsplatte zur Befestigung des Lenkstochbells -- Biztonsítólapp a kormánykar felszereléséhez	1	

1	2	3	4	5
22	380.1.47.31	Spacer disc -- Zwischenscheibe -- K6s- betét tárcsa	1	
23	380.9.47.203 MSs 7897	Flanged sealing ring -- Wellendichtung -- Karbantyas tömítőgyűrű	1	
	380.1.47.203	Bearing flange o/w bush -- Lagerflansch mit Nbohesen, komplett -- Csapágyperem pereszelyekkel, teljes	1	
24	170.0.47.17	Bush - bearing flange -- Műhöz a csapágyperem- gerflansch -- Persely a csapágyperem- hes	2	
25	380.9.47.27	Bearing flange -- Lagerflansch -- Csapágyperem	1	
25a	380.1.47.41	Gasket -- Dichtung -- Tömítő	1	
25b	M10 MSs 2210	Lock washer -- Federring -- Rugós alátét	6	
25c	M10 MSs 2260-68	Hexagon nut -- Szekantmutter, blank -- Hatlapp f. anya	6	
26	380.9.47.07a	Pitman shaft -- Lenkstocwelle -- Kor- mánykar tengely	1	
27	380.9.47.18	Double steering roller -- Doppellen- rolle -- Kettős kormánygörgő	1	
28	380.9.47.21	Spacer ring - roller bearing -- Zwi-	1	

1	2	3	4	5
29	380.9.47.09a	steering sur Rollenlagerung -- K6a- betétgyűrű a görgőgárasathoz	1	
30	380.9.47.203 MSs 7873	Bearing bush - steering roller -- Lager- műhöz a csapágyperem -- Csapágyperem sely a kormánygörgőhöz	48	
31	380.9.47.20b	Needle roller -- Nadelrolle -- Tűgö- gő	2	
32	170.0.47.40a	Thrust disc - steering roller -- Anlauf- scheibe sur Lenkrolle -- Nyomatéktárcsa a kormánygörgőhöz	1	
32a	M14x1.5 MSs 2291-68	Set screw - steering roller -- Panofiti sur Lenkrolle -- Illesztőcsavar a kormánygörgőhöz	1	
33	380.1.47.09	Flat nut -- Flanke Flachmutter -- Ala- csony f. anya	1	
34	380.1.47.09	Lock plate -- Sicherungsblech -- Bis- tosító lemez	1	
34-1	380.9.47-31	Shim 0,3 mm -- Einstellscheibe 0,3 mm -- Beállító tárcsa 0,3 mm	sz/sz	
34-2	380.9.47-32	Shim 0,5 mm -- Einstellscheibe 0,5 mm -- Beállító tárcsa 0,5 mm	sz/sz	
34-3	380.9.47-33	Shim 0,7 mm -- Einstellscheibe 0,7 mm -- Beállító tárcsa 0,7 mm	sz/sz	

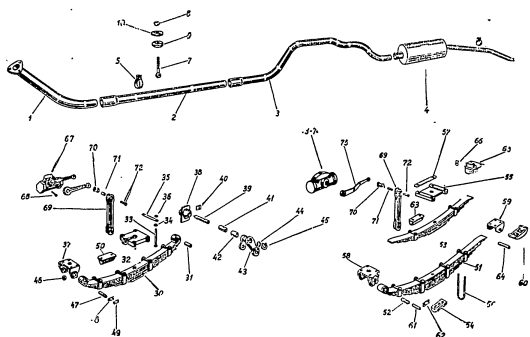
1	2	3	4	5
35	M14x1.5x90 MSs 2490-68	Fine-threaded bolt with 3 mm cotter pin bore — Schraube mit Feingewinde und 3 mm Splintbohrung — Finomszethű csavar 3 mm saszegefurattal	1	
35a	M14 MSs 2201	Washer — Unterlagscheibe, blank — Pényes alátét	3	
35b	M14x1.5 MSs 2294	Castellated nut — Kronenmutter, blank — Koronás f, anya	3	
35c	3x30 MSs 2224	Cotter pin — Splint — Saszeg	3	
40	380.2.43.02	Steering arm — Lenkhebel — Kormánykar	1	
-	3454-11-16	Drag link, complete — Lenkstange, komplett	1	
41	245411-17	Drag link — Lenkstange — Kormánytolórud	1	
41a	GA MSx1 MSs 513	Grease nipple — Druckschalterknopf mit Angel — Golyós szelvésgomb	2	
-	380.2.43.04	Track rod, complete — Spurstange, komplett — Nyomtávrúd komplett	1	
42	380.2.43.08	Track rod — Spurstange — Nyomtávrúd	1	
42a	GC-MSx1 MSs 513	Grease nipple — Druckschalterknopf mit Angel — Golyós szelvésgomb	2	

1	2	3	4	5
43	380.2.43.06	Threaded ball joint — Kugelhülse mit Gewinde — Menetes gömbök	4	
44	M10x1.5x40 MSs 2490-68	Fine-threaded bolt — Schraube mit Feingewinde — Finomszethű csavar	8	
44a	M10x1 MSs 2294-68	Fine-threaded castellated nut — Blank Kronenmutter mit Feingewinde — Finomszethű koronás f, anya	8	
44b	2.5x25 MSs 2224	Cotter pin — Splint — Saszeg	8	
45	380.2.43.11	Upper bearing cup — Obere Kugelschale — Felül gömbösécs	4	
46	380.2.43.09	Ball and shank — Kugelsapfen — Gömböcsny	4	
47	380.2.43.10	Lower cup — Untere Kugelschale — Alsó gömbösécs	4	
48	380.2.43.12	Compression spring — Druckfeder — Bőszitő rugó	4	
49	380.2.43.13	Threaded cap — Verschlusskappe mit Gewinde — Menetes sapka	4	
50	380.2.43.18	Circolip — Sicherungsring — Bistool-tő gyűrű	4	
51	380.2.43.16	Lower dust protecting cap — Untere Staubkappe — Alsó porzsapka	4	

1	2	3	4	5
52	380,2.43.15	Upper dust protecting cap -- Obere Staubkappe -- Felad poraszka	4	
53	380,2.43.17	Washer -- Federnde Unterlagscheibe -- Koronarugó	4	
54	M18x1,5 MS 2292-68	Flat castellated nut -- Flache Kronenmutter, blank	4	
54a	4x35 MS 2224	Cotter pin -- Splint -- Sasasag	4	

L-XXI.

Exhaust system, road springs, shock absorbers
 Auspuffleitung, Tragfedern, Stossdämpfer
 Kipuffogóvezeték, hordrugók, lengéscsillapítók



L-XXI.

Fig. No. / Abb. Sz.	No. / Sz.	Description / Besenung / Megnevesés	Pc. / St. / db.	Remarks / Megjegyzés
1	2	3	4	5
EXHAUST SYSTEM, ROAD SPRINGS, SHOCK ABSORBERS — AUSPUFFLEITUNG, TRAGFEDERN, STOSSDÄMPFER — KIFUFGÓ VEZETÉK HORDRUGOK LENGÉSCSILLAPÍTÓK				
1	31L.1-1400-002	Front exhaust pipe complete — Vorderer Auspuff, komplett — Hataló kipufogó teljes	1	
2	31L.1-1400-006	Straight exhaust pipe — Gerades Auspuffrohr — Egyenes kipufogócső	1	
3	31L.1-1400-011	Exhaust pipe over rear axle — Auspuffrohr über der Hinterrachsebrücke — Kipufogócső a hátsóhátfellett	1	
4	31L.1-1400-013	Silencer with end pipe — Hinteres Auspuffrohr und Auspufftopf, komplett — Hátsókipufogócső és hangtompító teljes	1	
5	31L.1-1400-008	Clamp — Rohrschelle — Csőbillincs	3	
6	31L.1-1400-022	Clamp — Rohrschelle — Csőbillincs	2	

1	2	3	4	5
6a	M10-30 MSs 2463	Hexagon bolt threaded to the head -- Blanke Sechskantschraube mit Feingewinde -- Hatlapjeju tdivigantes f. osavaf	5	
6b	M10 MSs 2260	Hexagon nut -- Blanke Sechskantmutter -- Hatlapu f. anya	5	
6c	M10 MSs 2210	Lock washer -- Federring -- Rugds alátót	5	
	J1L1-1400-031	Hanger bolt complete -- Auspuffaufhängung, komplett -- Függesztő teljes	5	
7	J1L1-1400-32	Hanger bolt -- Auspuffaufhängung -- Függesztő	5	
8	M10 MSs 2260	Hexagon nut -- Blanke Sechskantmutter -- Hatlapu f. anya	15	
9	A73-36-2	Rubber washer -- Gummilátér -- Gummilátér	10	
10	A73-36-1	Plate - rubber washer -- Teller sur Gummilátér -- Tányér a gumilátérhez	10	
30	J1L2-3702-000	Front spring -- Vordere Tragfeder -- Wellidő hordrug	2	
30-1	-	Main leaf I of the front spring -- Hauptblatt I. sur vorderen Aufhängungsfeder -- Főlap a mellőrugóhoz I	-	

1	2	3	4	5
30-2	-	Main leaf II of the front spring -- Hauptblatt II. sur vorderen Aufhängungsfeder -- Főlap a mellőrugóhoz II	-	
31	A54-2-5 247-2-5	Spring eye bush - front spring -- Federbüchse sur Vorderfeder -- Rugóperelyű a mellőrugóhoz	4	
32	170.0.68.16	Spring clamping plate -- Federspannplatte sur Vorderfeder -- Rugószorítólap	2	
33	M16x1,5x140 MSs 2490	Fine-threaded bolt -- Blanke Schraube mit Feingewinde -- Finommenetű f. osavar	8	
34	A54-2-51	Nut M16x1,5 -- Mutter M 16x1,5 -- Anya M16x1,5	8	
35	1A60-22-3	Lock plate -- Sicherungsblech -- Biztonsítótábla	4	
36	1A54-2-52	Lock nut M16x1,5 -- Gegenmutter M16x1,5 -- Ellenanya M16x1,5	8	
37	2A73-2202-1	Front bracket - front spring -- Vorderer Federbock sur Vorderfeder -- Mellőrugó mellőrugó	2	
37a	M16x1,5x100 MSs 2490	Fine threaded bolt -- Blanke Schraube mit Feingewinde -- Finommenetű f. osavar	8	

1	2	3	4	5
37b	M16x1.5 MSz 2290	Fine threaded nut -- Blanke Mutter mit Feingewinde -- Finommenetű f. anya	8	
37c	M16 MSz 2209	Lock washer -- Federring mit Nase -- Orrós rugós alátét	8	
38	6A73-1132-042	Rear bracket - front spring -- Hinterer Federbock zur Vorderfeder -- Mellsőrugó hátsóbak	2	
39	6A73-1132-043	Spring shackle pin -- Tragbolzen zum Federbügel -- Rugókengyel tartó csap	2	
40	6A73-1132-044	Lock plate -- Sicherungsblech -- Biztonsítólap	2	
41	380.9.52.30	Rush -- Büchse -- Persely	2	
42	380.9.52.27	Rush -- Büchse -- Persely	2	
43	380.9.52.26	Shackle -- Federbügel -- Rugókengyel	2	
44	380.9.52.29	Washer -- Unterlagscheibe -- Alátét-tárcsa	sz/na	
45	380.9.52.31	Clamp ring -- Klemmring -- Szorítógyűrű	2	
45 a	M12x75 MSz 2461	Hexagon bolt, threaded to head -- Blanke Sechskantschraube mit Vollgewinde -- Hatlapfejű tövigenetes f. csavar	2	

1	2	3	4	5
45b	M12 MSz 2260	Hexagon nut -- Blanke Sechskantmutter -- Hatlap f. anya	2	
45c	M12 MSz 2210	Lock washer -- Federring -- Rugós alátét	2	
46	1A51-2-12	Washer -- Unterlagscheibe -- Alátét	4	
47	380.9.52.13	Spring bolt -- Federbolzen -- Rugós csapcszeg	2	
48	1A51-2-9	Lock plate -- front spring bolt -- Sicherungsplatte zum Vorderfederbolzen -- Retess a mellsőrugó csapcszeghez	4	
49	1A51-2-11	Lock plate -- Sicherungsblech -- Biztonsítólamesz	6	
49a	M8x1.5 MSz 2463	Hexagon bolt threaded to head -- Blanke Sechskantschraube mit Vollgewinde -- Hatlapfejű tm.f. csavar	4	
49b	GA M8x1 MSz 513	Grease nipple -- Druckschmierknopf mit Kugel -- Golyós zsírszögomb	6	
50	1A51-V11-13	Rubber buffer - front axle -- Gummianschlag zur Vorderachse -- Utközagumi a mellső tengelyhez	2	
50a	M10x25 MSz 2463	Hexagon bolt threaded to head -- Blanke Sechskantschraube mit Vollgewinde -- Hatlapfejű tövigenetes f. csavar	4	

1	2	3	4	5
50b	M10 MSz 2210	Lock washer -- Federring -- Rugós alátét	4	
51	31L.2-3711-000	Rear spring -- Hintere Tragfeder -- Hátsó Hórdrugó	2	
51-1	-	Main leaf I - rear spring -- Hauptblatt I. sur hinteren Aufhängungsfeder -- Főlap a hátsórugóhoz I.	-	
51-2	-	Main leaf II - rear spring -- Hauptblatt II. sur hinteren Aufhängungsfeder -- Főlap a hátsórugóhoz II.	-	
52	1A54-2-6	Rear spring eye bush -- Federbüchse sur Hinterfeder -- Rugópersely a hátsórugóhoz	2	
53	31L.1-3712-000	Auxiliary spring -- Hilfefeder -- Szegődrugó	2	
54	1A54-2-41	Arched spring clamping plate -- Gewölbte Deckplatte -- Íves horidőlap	2	
55	31L.1-3302-007	Clamping plate - rear spring -- Spannplatte sur Hinterfeder -- Szorítólap a hátsórugóhoz	2	
56	31L.1-3302-006	Rear spring clip -- Bügel sur Hinterfeder -- Kengyel a hátsórugóhoz	4	
56a	M8x5 MSz 2290	Fine-threaded nut -- Blanke Mutter mit Feingewinde -- Finommenetű f. anya	16	

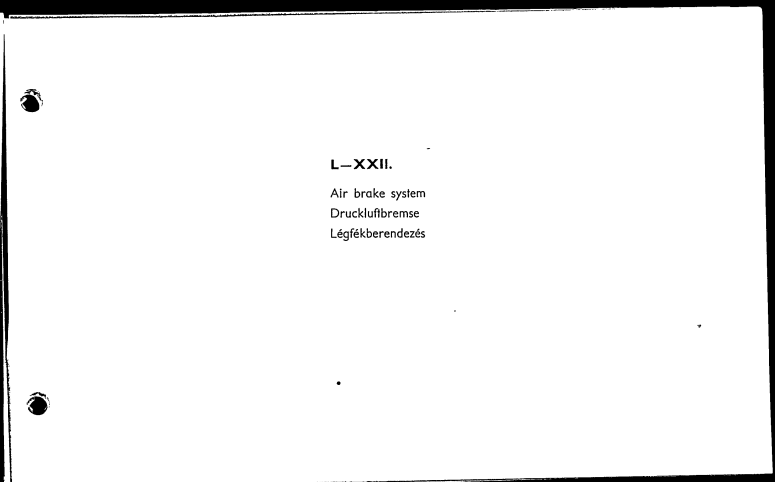
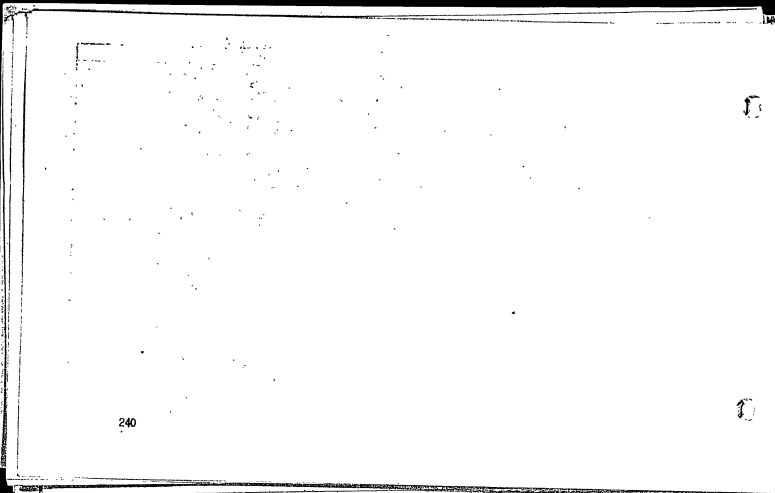
1	2	3	4	5
57	1A54-2-43	Lock plate -- Sicherungsblech -- Biztonsítótálcás	4	
58	3A60-2202-1	Front bracket - front spring -- Vorderer Federbock zur Vorderfeder -- Mellsőrugó mellsőbök	2	
58a	M16x1,5x40 MSz 2490	Fine-threaded bolt -- Blanke Schraube mit Feingewinde -- Finommenetű f. oszvar	8	
58b	M16xMSz 2209	Lock washer -- Federring mit Nase -- Orros rugós alátét	8	
59	31L.1-3302-017	Insert piece to the spring bracket -- Einlage zum Federbock -- Rugóbök betét	2	
60	1A51-2-16/1	Sliding shoe -- Gleitplatte -- Guszószál	2	
60a	M10x2F MSz 2463	Hexagon bolt threaded to the head -- Blanke Sechskantschraube mit Vollgewinde -- Hatlapfejű tövigentes f. oszvar	8	
60b	M10 MSz 2210	Lock washer -- Federring -- Rugós alátét	8	
61	1A60-2202-5	Spring bolt -- Federbolzen -- Rugós csapácsolás	2	

1	2	3	4	5
62	1A60-2202-4	Lock plate -- Sicherungsplatte -- Retem	2	
62a	M3x20 MS 2465	Hexagon bolt threaded to the head -- Blanke Sechskantschraube mit Vollgewin- de -- Hatlapfejű tövigmentes f. cs.	4	
62b	M14x1,5x80 MS 2490	Pin-threaded bolt -- Schraube mit Fein- gewinde -- Finommenetű csavar	2	
62c	M14x1,5 MS 2290	Pin-threaded nut -- Mutter mit Fein- gewinde -- Finommenetű f. anya	2	
62d	M14 MS 2209	Lock washer -- Federring mit Nase -- Orros rugós alátét	2	
62e	GA M3x1 MS 511	Grease nipple -- Druckschalterknopf mit Kugel -- Golyós szűrőgomb	2	
63	1A51-V11-19	Rubber buffer - rear axle -- Gumian- schlag sur Hinterachse -- Ütközőgumi a hátsó tengelyhez	2	
63a	M10x25 MS 2465	Hexagon bolt threaded to the head -- Blanke Sechskantschraube mit Vollge- winde -- Hatlapfejű tövigmentes f. cs.	4	
63b	M10 MS 2210	Lock washer -- Federring -- Rugós alá- tét	4	
64	31L1-3202-041	Spacer tube -- Abstandsrohr -- Táv-	2	

1	2	3	4	5
64a	M16x150 MS 2200	Hexagon bolt -- Sechskantschraube -- Hatlapfejű nyers csavar	2	
64b	M16 MS 2264	Castellated nut -- Kronenmutter, blank -- Koronás fényes anya	2	
64c	M16 MS 2201	Washer -- Unterlagscheibe, blank Fényes alátét	2	
64d	4x35 MS 2224	Cotter pin -- Splint -- Sasaség	2	
65	1A54-2-91	Rubber buffer - auxiliary spring -- Gum- iámschlag sur Hilfsfeder -- Segéd- rugó mellékfedél	4	
66	1A54-2-95	Lock plate -- Sicherungsblech -- Bis- tosítólemez	16	
66a	M10x20 MS 2465	Hexagon bolt threaded to head -- Sech- kantschraube mit Vollgewinde -- Hat- lapfejű tövigmentes	16	
67	2A54-35-1	Front shock absorber RS-LH -- Vorderer Stoßdämpfer, rechts-links -- Weiből lengőscsillapító jobb-bal	2	
68	1A54-35-9 M16x15 MS 2290	Screw -- Kopfschraube M 16x1,5 -- Fe- jescsavar M16x1,5	4	
68a		Pin-threaded nut -- Blanke Mutter mit Feingewinde -- Finommenetű f. anya	4	

1	2	3	4	5
68b	M16 MSa 2209	Lock-washer -- Federring mit Nase -- Orros rugds aldtét	4	
69	1A54-35-8	Shock absorber arm -- Verbindungsarm -- Összekötőkar	4	
70	170.0.68.20	Rubber bush -- Gummibüchse -- Gumiper- sely	8	
71	170.0.68.21	Steel bush -- Stahlbüchse -- Acélper- sely	8	
72	1A54-35-17	Pin -- Bolzen -- Csap	8	
72a	M12x1.5 MSa 2200	Fine-threaded nut -- Flanke Mutter mit Feingewinde -- Finomszettű f. anya	8	
72b	M12 MSa 2210	Lock washer -- Federring -- Rugds aldtét	8	
-	-	Front shock absorber -- Vorderer Stoß- dämpferarm -- Mellső lökéscsillapít- tőkar	-	
73	1k78/b	Shock absorber LH, without arm -- Stoß- dämpfer ohne linken Arm -- Lökéscsill- lapító bal kar nélküli	1	
74	1k78/j	Shock absorber RH, without arm -- Stoß- dämpfer ohne rechten Arm -- Lökés- csillapító jobb kar nélküli	1	

1	2	3	4	5
74a	M16x90 MSa2360	Hexagon bolt -- Sechskantschraube -- Hatlapfejű nyers csavar	4	
74b	MSa 16MSa2260	Hexagon nut -- Flanke Sechskantmutter -- Hatlapú f. anya	4	
74c	M16 MSa 2210	Lock washer -- Federring -- Rugds aldtét	4	
75	31L.1-3302-05	Shock absorber arm, rear -- Hinterer Stoßdämpferarm -- Lökéscsillapítókar hátsó	2	



L-XXII.

Air brake system
Druckluftbremse
Légfékberendezés

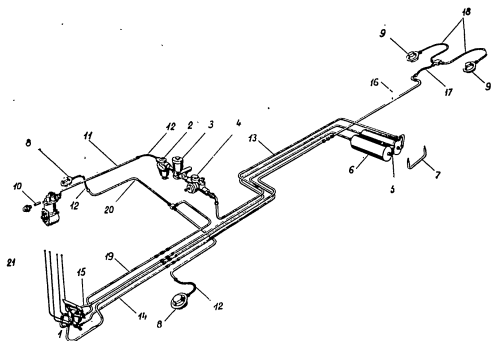


Fig. No. / Ábra	No. / Sz.	Description / Bennezung / Megnevezés	Qc. / St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
AIR BRAKE SYSTEM — DRUCKLUFTSYSTEM — LEFÜTK BERRENDEZÉS				
1	3A66-2504	Brake pedal — Druckplattenventil — Péktápadó szelep	1	
2	L-3.00	Tyre inflator cylinder — Reifenfüll- flasche — Kerekfúvóeszköz palack	1	
3	L-15.00	Anti-freeze pump — Frostschutzpumpe — Fagyvédő szivattyú	1	
4	L-4.00	Pressure control valve — Druckregler- ventil — Nyomás szabályzó szelep	1	
5	VI106 III.522	Check valve /Knorr/ — Rückschlagventil /Knorr/ — Visszaoszpó szelep /Knorr/	1	
6	M91.12-330/1	Air tank, 35 l — Druckluftbehälter, 35 Liter — Légtartály 35 l	2	

1	2	3	4	5
7	31L,2-3804-026	Clasping strap to the tank -- Druckle- schose zum Luftbehälter -- Tartály-le- szorító heveder	2	
7a	M10 MSs 2260	Hexagon nut -- Sechskantmutter, blank -- Hatlapu fényes anya	8	
8	KZL-7	Wheel brake cylinder front -- Vorderer Radbremszylinder -- Kerékhenger előléd	2	
9	KZL-8	Wheel brake cylinder rear -- Hinterer Radbremszylinder -- Kerékhenger hátsó	2	
10	31L,2-3804-028	Air filter extension -- Ansatz zum Luftfilter -- Toldat a levegőszűrő- höz	1	
11	31L,2-3804-031	Air pipe from compressor to flexible hose, complete -- Komplettes Luftkompre- sor und Schlauch -- Levegőcső a	1	

1	2	3	4	5
		légeuritőtől a hajlékony tömögig teljes		
12	31L,2-3804-04	Flexible brake hose, complete -- Kom- pletter biegsamer Luftschlauch -- Haj- lékony tömög teljes		5
13	31L,2-3804-02	Air pipe from pressure control valve to air tank, complete -- Luftrohr vom Druckreglerventil bis zum Luftbehälter, komplett -- Levegőcső a nyomás- bírázó szeleptől a légtartályig teljes		1
14	31L,2-3804-05	Air pipe from first tank to brake pedal -- Luftrohr vom ersten Behälter bis zum Druckplattenventil, komplett -- Levegőcső az első tartálytól a féktá- pódáéig teljes		1
15	31L,2-3804-06	Air pipe from second tank to brake pedal -- Luftrohr vom zweiten Behälter bis zum Druckplattenventil, komplett -- Levegőcső a féktápadáéig teljes		1
16	31L,2-3804-05	Air pipe from brake pedal to rear brake		1

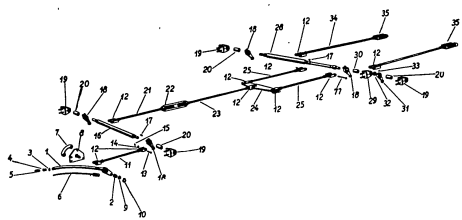
1	2	3	4	5
		hose — Luftrohr vom Druckplattenventil bis zum hinteren Schlauch, komplett — Levegőcső a féktáposól a hátsó hajlékony tömlőig teljes	1	
17	51L,2-3804-071	Flexible brake hose, complete — Kompletter biegsamer Schlauch — Hajlékony tömlő teljes	1	
18	51L,2-3804-075	Air pipe from rear brake hose to brake cylinder — Luftrohr vom hinteren Schlauch bis zum Bremszylinder, komplett — Levegőcső a hátsó hajlékony tömlőtől a fékhengerig teljes	2	
19	51L,2-3804-081	Air pipe from brake pedal to the front wheel brake cylinder complete — Luftrohr vom Druckplattenventil bis zu den vorderen Radbremszylindern, komplett — Levegőcső a féktáposól a mellő kerék fékhengerekhez teljes	1	
20	51L,2-3804-085	Air pipe to the front brake cylinders — Komplettes Luftrohr zu den vorderen Radbremszylindern — Levegőcső a mellő kerékfékhengerekhez teljes	2	
21	51L,2-3804-091	Air pipe to the gauges, complete — Komplettes Luftrohr zu den Instrumenten — Levegőcső a műszerekhez teljes	4	

1	2	3	4	5
		Pipe fittings Rohrarmaturen Csőcsatlakozások		
1A60-25-2		Cross pipe — Kreuzstück — Keresztelágás	1	
4A54-42-57		T-piece M22x1,5 — Dreiwegstück M 22x1,5 — T elágás M22x1,5	3	
2A54-42-54		Knee junction — Krümm — Könyökcsatlakozás	5	
1A60-25-3		Knee junction with pipe branch — Krümm mit Abweigstück — Könyökcsatlakozás elágással	2	
DL2-1k-268		Joint screw M 22x1,5 — Zwischenschraube M 22x1,5 — Közösavar M 22x1,5	3	
DL2-1k-268		Joint screw, M 22x1,5 lang — Zwischenschraube M 22x1,5 lang — Közösavar M22x1,5 hosszú	6	
D22x27A1 MS 18716		Sealing ring — Dichtungsring — Tömítógyűrű	15	
A14x20 F1 MS 18716		Sealing ring — Dichtungsring — Tömítógyűrű	os/oz	
15-1k-269		Clamp ring — Sperring — Sacritógyűrű	sz/sz	

1	2	3	4	5
15-1k-270	Thrust ring -- Sperring -- Nyomóggyűrű	es/az		
215-1k-267	Union nut F 22x1,5 -- Drukring -- Hollandi anya #22x1,5	26		
2154-42-42	Hose junction -- Schlauchanschluss -- Tömésatlakozó	4		
1A54-42-56	Hose junction -- Schlauchanschluss -- Tömésatlakozó	4		
61k-269	Clamp nut -- Drukring -- Saorítógyűrű	es/az		
61k-267	Union nut M 12x1,5 -- Holländer M12x1,5 Hollandi anya M 12x1,5	8		
400,0,36,60	Junction to the brake cylinders -- An- schluss an den Bremszylinder -- Gát- lakozó a fékhengeréhez	4		

L-XXIII.

Hand brake
Handbremse
Kézfék



L-XXIII.

1	2	3	4	5
		hoz		
6	31L,1-3801-021	Fixing rod, complete -- Fixierstab komplett -- Rögcsipőálcia teljes	1	
7	170.0.35.21	Toothed segment -- hand brake -- Zahnbo- gen -- Fogasív	1	
7a	M10x20 MSz 246	Hexagon bolt threaded to the head -- Blanke Sechskantschraube mit Vollgewin- de -- Hatlapfejű tövigmenetes f. csav- var	1	
7b	M10 MSz 2210	Lock washer -- Federring -- Rugós alá- tét	1	
8	31L,1-3801-031	Hand brake bracket, complete -- Hand- bremshebelbock komplett -- Kézifék- kar bak teljes	1	
8a	M10x20 MSz 2461	Hexagon bolt -- Blanke Sechskantschrau- be -- Hatlapfejű f. csavar	1	
8b	M10x60 MSz 2461	Hexagon bolt -- Blanke Sechskantschrau- be -- Hatlapfejű f. csavar	2	
8c	M10 MSz 2260	Hexagon nut -- Blanke Sechskantschraube -- Hatlap f. anya	3	
8d	M10 MSz 2210	Lock washer -- Federring -- Rugós alá- tét	3	

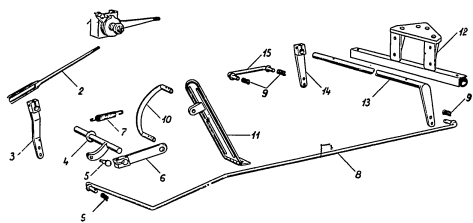
1	2	3	4	5
9	M22 MSz 2201	Washer -- Unterlagscheibe, blank -- Pólyes alátét	1	
10	22 MSz 232	Clamp -- Sperring mit Feder -- Rugós rögcsipőkarika	1	
	31L,1-3801-041	Front pull rod, complete -- Vordere Zug- stange komplett -- Mellső vonórúd teljes	1	
11	31L,1-3801-042	Front pull rod -- Vordere Zugstange -- Mellső vonórúd	1	
12	1A54-1J-35-1	Clevis head -- Gabelkopf -- Villőfej	9	
12a	M10MSz 2260 M2x38x50 MSz 2229	Hexagon nut -- Sechskantschraube, blank -- Hatlap f. anya	13	
13	M2x38x50 MSz 2229	Small headed pin -- Schliessbolzen -- Fejes csapszeg	11	
14	12 MSz 2233	Washer -- Bolzenunterlage, blank -- Pólyes csapszegalátét	12	
15	4x20 MSz 2224	Cotter pin -- Splint -- Saszeg	12	
	31L,1-3801-050	Front intermediate shaft Assy -- Vorde- re Vermittlerwelle, zusammengesetzt -- Mellső közi tengely Ö.Ö.	1	
16	31L,1-3801-052	Front intermediate shaft, Assy -- Vorde- re Vermittlerwelle, komplett -- Mellső	1	

1	2	3	4	5
		só kúalótengely teljes		
17	8x7x20 MSa2306	Pin - catch lock -- Rundstirnige Passfeder -- Páskes retens	4	
18	1A54-13-15/1	Lever No 75 -- Übertraghebel NE 75 -- Kúalókar 75-8a	4	
18a	MSx50 MSa2461	Hexagon bolt -- Sechskantschraube, blank -- Hétlappos f. oszvar	4	
18b	MS MSa 2260	Hexagon nut -- Sechskantmutter -- Hétlappos anya	4	
18c	MS MSa 2210	Lock washer -- Federring -- Rugós alátét	4	
19	31L,1-3801-061	Bearing support, complete -- Lagerbock, komplett -- Csapógybak teljes	3	
19-1	31L,1-3801-062	Bearing support -- Lagerbock -- Csapógybak	4	
20	31L,1-3801-063	Shaft -- Achse -- Persely	3	
20-1	31L,1-3801-070	Intermediate linkage Assy. -- Zwischenstück zusammenmontiert -- Közvetlenes rudasat 0,4.	1	
20a		Stud -- Stiftschraube -- Ásákoszavar	10	
		Hexagon nut -- Sechskantmutter, blank -- Hétlappos f. anya	10	

1	2	3	4	5
21	31L,1-3801-072	Pull rod II -- Zugstange II. -- Vondórúd II.	1	
22	M10 MSa 2186	Open turnbuckle -- Offene Spannschleimutter -- Nyitott feszítőanya	1	
22a	MS 2260 M10 MSa bol	Hexagon nut -- Sechskantmutter, blank -- Hétlappos f. anya	1	
23	31L,1-3801-073	Pull rod III -- Zugstange III. -- Vondórúd III.	1	
24	31L,1-3801-076	Compensator lever -- Ausgleichhebel -- Kiegyenlítőkar	1	
25	31L,1-3801-082	Pull rod IV -- Zugstange IV. -- Vondórúd IV.	2	
26	31L,1-3801-085	Wide fork end -- Breiter Gabelkopf -- Széles villásféj	1	
27	31L,1-3801-090	Rear intermediate shaft Assy. -- Hintere Vermittlerwelle, zusammenmontiert -- Hátsó kúalótengely 0,4.	1	
28	31L,1-3801-092	Rear intermediate shaft, complete -- Hintere Vermittlerwelle, komplett -- Hátsó kúalótengely teljes	1	
29	31L,1-3801-096	Bearing support, complete -- Lagerbock komplett -- Csapógybak teljes	1	

1	2	3	4	5
30	ILL.1-3801-104	Rush -- Múhse -- Persely	1	
31	ILL.1-3801-106	Intermediate lever, complete -- Übertragabel, komplett -- Kúalókar teljes	1	
31-1	ILL.1-3801-107	Intermediate lever -- Übertragabel -- Kúalókar	1	
32	ILL.1-3801-108	Rush -- Múhse -- Persely	1	
33	DANAG 84 MS 513	Grease nipple -- Druckschmierknopf mit Kugel -- Golyós zsíradgomb	1	
34	ILL.1-3801-112	Pull rod V. -- Zugstange IV. -- Vondrud V.	2	
35	ILL.1-3801-114	Clevis head with key-way -- Kulissengabelkopf -- Kulissés villásfej	2	
36	ILL.1-3801-008	Suspension spring -- Aufhängefeder -- Felüggesztő rugó	2	

L-XXIV.
Throttle control
Gásgestänge
Gázrudazat



L-XXIV.

Fig. No. / Ábra.	No. / Sz.	Description / Beműnzung / Megnevezés	Q'ty. / St. / db.	Remarks / Beműnkung / Megjegyzés
1	2	3	4	5
THROTTLE CONTROL -- GASSTANGE -- GÁZKUDAZAT				
1	1A7J-2405	Hand lever assy. - throttle control -- Árs aus Fahrershebel, komplett -- Kézszákar teljes	1	
1a	1A60-24-12	Washer -- Unterlagscheibe -- Alátét	2	
1b	1A60-2406-4	Throttle hand lever -- Gashebel -- Gázkar	1	
1c	HCx4,5	Ball pin - ball joint -- Kugelsapfen zum Kugelgelenk -- Gombosap a gombosuklóhoz	1	
1d		Plastic knob -- Hebelknopf aus Kunststoff -- Műanyagdob	1	
1e	1A60-24-11	Thrust plate -- Pressplatte -- Szorítólap	1	
1f	1A60-24-10	Spring -- Feder -- Rugó	1	

1	2	3	4	5
1g	1A60-24-9	Spring cup -- Federteller -- Rugdátá-nyer	1	
1h	M6 MSs 2260	Hexagon nut -- Seohakantmutter, blank -- Hatlapu f. anya	1	
2	1A73-2404	Connection rod I., complete -- Verbin- dungsstange I., komplett -- Összekötő- rud I. teljes	1	
2a	M6 MSs 2260	Hexagon nut -- Seohakantmutter, blank -- Hatlapu f. anya	1	
2b	IK315	Lock plate - ball joint -- Sicherungs- blech zum Kugelselenk -- Gombocuklis biztosító lemez	1	
2c	A20 MSs 6458	Ball cup -- Kugelschale -- Gombocsisze	1	
3	1A73-2403	Intermediate arm I., complete -- Vermitt- lerarm I., komplett -- Közélskar I. teljes	1	
3a	M6x32 MSs2461	Hexagon bolt -- Seohakantschraube, blank -- Hatlapfejű f. oszvar	1	
3b	M6 MSs 2210	Lock washer -- Federring -- Rugós alá- tét	1	
3c	M6 MSs 2260	Hexagon nut -- Seohakantmutter, blank -- Hatlapu f. anya	1	

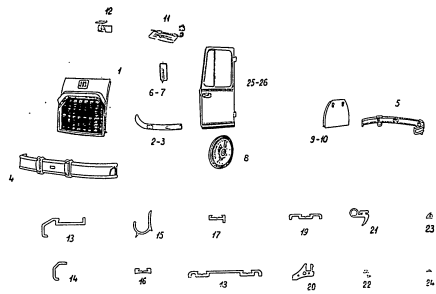
1	2	3	4	5
4	31L,1-1510-022	Accelerator lever Assy -- Arm zum Fahr- schiebel -- Gáspedálkar teljes	1	
5	1A51-14-46	Collar screw -- Flanschschraube -- Peremcsavar	1	
5a	M6 MSs 2210	Lock washer -- Federring -- Rugós alá- tét	1	
5b	M6 MSs 2260	Hexagon nut -- Seohakantmutter, blank -- Hatlapu f. anya	1	
6	31L,1-1510-031	Intermediate arm II., complete -- Vermitt- lerarm II., komplett -- Közélskar II. teljes	1	
6a	M6x32 MSs2461	Hexagon bolt -- Seohakantschraube, blank -- Hatlapfejű f. oszvar	1	
6b	M6 MSs 2210	Lock washer -- Federring -- Rugós alá- tét	1	
6c	M6 MSs 2260	Hexagon nut -- Seohakantmutter, blank -- Hatlapu f. anya	1	
7	1A51-14-53	Return spring -- Rücksprungfeder -- Viss- zahúzó rugó	1	
8	31L,1-1510-041	Connecting rod II., complete -- Verbin- dungsstange II., komplett -- Összekötő- törzs II. teljes	1	

1	2	3	4	5
9	1451-14-98	Spring -- Feder -- Rugó	4	
9a	M6 MSz 2201	Washer -- Unterlagscheibe, blank -- P6-nyes alátét	8	
9b	1,5x12/2224 MSz	Cotter pin -- Splint -- Saszeg	4	
10	A77-24-4	Push rod -- Drukstange -- Nyomórúd	1	
10a	M672201 MSz	Washer -- Unterlagscheibe, blank -- P6-nyes alátét	4	
10b	1,5x10 MSz2224	Cotter pin -- Splint -- Saszeg	4	
11	A77-2406	Accelerator pedal, complete -- Fahrpedal, komplett	1	
11a	M6x20 MSz2461	Hexagon bolt -- Sechskantschraube, blank -- Hatlapfejű f. csavar	2	
11b	M6 MSz 2210	Lock washer -- Federring -- Rugós alátét	2	
11c	M6 MSz 2260	Hexagon nut -- Sechskantmutter, blank -- Hatlap f. anya	2	
12	311.1-1510.066	Filter and by-pass lever bracket, complete -- Kompletter Filter-und Gasabstragungshebel -- Szűrő és Gázáttevő tartó, teljes	1	
12a	M8x25 MSz2461	Hexagon bolt threaded to the head	4	

1	2	3	4	5
12b	M8 MSz 2210	Sechskantschraube, blank, mit Vollgewinde -- Hatlapu tm f. csavar	4	
13	1A73-2406-1	Look washer -- Federring -- Rugós alátét	1	
13a	M12 MSz 2201	Intermediate shaft with lever to change admission -- Vermittlerwelle zur Änderung der Füllung -- Közvetítőcsigolykarral a töltés váltogatásához	2	
13b	M2,5x25 MSz2224	Washer -- Blanke Unterlagscheibe -- Pényes alátét	2	
14	1A73-2407	Cotter pin -- Splint -- Saszeg	1	
14a	M6x12 MSz 2461	Intermediate arm III, complete -- Vermittlerarm III, komplett -- Közlőkar III, teljes	1	
14b	M6 MSz 2210	Hexagon bolt -- Sechskantschraube, blank -- Hatlapfejű f. csavar	1	
14c	M6 MSz 2260	Lock washer -- Federring -- Rugós alátét	1	
15	1A73-2408	Hexagon nut -- Sechskantmutter, blank -- Hatlapu f. anya	1	
		Connecting rod III complete -- Verbindungstange III, komplett -- Összekötőrúd III, teljes	1	

L-XXV.

Fittings
Armaturen, Ausstattung
Szerelvények



L-XXV.

Fig. No. / Ill.	No. / Sz.	Description / Beszámolás / Megjegyzés	Pg. / St. / db.	Remarks / Megjegyzés
1	2	3	4	5
PITTSBURGH — AKKARATOK, AUSSTATTUNG — SZERKELVÉNYEK				
1	311.1-9151-000	Radiator grill — Kühlermaske — Hűtőmaszk	1	
2	311.1-7225-000	Front fender, LH — Vordere Verzierung, links — Hátuló dísz bal	1	
3	311.1-7226-000	Front fender, RH — Vordere Verzierung, rechts — Hátuló dísz jobb	1	
4	311.1-9105-000	Front bumper — Vorderer Stoßfänger — Hátuló lökhárító	1	
5	311.1-9106-000	Rear bumper — Hinterer Stoßfänger — Elöl lökhárító	1	
6	E-193	Outside retrovisor LH — Ausserer Rück- Spiegel, links — Külső vissza- pillanós tükör bal	1	
7	K-192 R.D.	Outside retrovisor RH — Ausserer Rück- Spiegel, rechts — Külső vissza- pillanós tükör jobb	1	

Pz. Abz. Abz.	No. No. No.	Description Beschreibung Megnevezés	Po. St. db.	Remarks Bemerkung Megjegyzés
1	2	3	4	5
FITTING — ARMATUREN, AUSSTATTUNG — SZERELVÉNYEK				
1	J1L.1-9151-000	Radiator grill — Kuhlerraste — Hűtő- rács	1	
2	J1L.1-7225-000	Front mascot, LH — Vordere Verzierung, links — Mellső dísz bal	1	
3	J1L.1-7226-000	Front mascot, RH — Vordere Verzierung, rechts — Mellső dísz jobb	1	
4	J1L.1-9105-000	Front bumper — Vorderer Stoßfänger — Mellső lökhárító	1	
5	J1L.1-9106-000	Rear bumper — Hinterer Stoßfänger — Hátsó lökhárító	1	
6	E-193	Outside retrovisor LH — Äusserer Rück- sichtspiegel, links — Külső vissza- pillanás tükr. bal	1	
7	E-192 R.N.	Outside retrovisor RH — Äusserer Rück- sichtspiegel, rechts — Külső vissza- pillanás tükr. jobb	1	

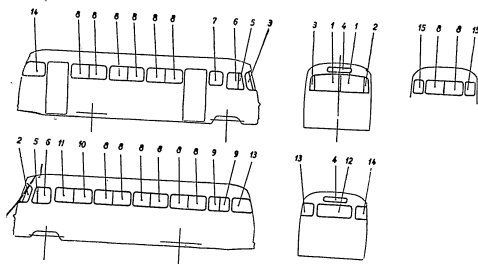
1	2	3	4	5
		blüchspiegel, rechts -- Kúlad visszapillantó tükör jobb	1	
8	JLL-1-9135-002	Wheel pants -- Radlerkappe -- Kerék-díszdrósa	4	
9	JLL-1-8275-004	Rear wheel drum cover RH -- Hintere Trommelverschaltung, rechts -- Hátsó dobtakaró jobb	1	
10	JLL-1-8276-006	Rear wheel drum cover LH -- Hintere Trommelverschaltung, links -- Hátsó dobtakaró bal	1	
11	JAGG-6202	Sun visor -- Sonnenblende -- Napellenő	1	
12	K-176	Inner retrovisor -- Innerer Rückblickspiegel -- Belső visszapillantó tükör	1	
13	K-202	Window frame section, outer -- Äusserer Fensterahmen -- Kúlad ablakkeret idom	-	
14	K-203	Window frame section, inner -- Innerer Fensterrahmen -- Belső ablakkeret idom	-	
15	JLMS 1239	Weather moulding section -- Regenrinne -- Esőcsatorna idom	-	

1	2	3	4	5
16	K-131	Inner fillet section -- Innere Deckleiste -- Belső takaró idom	-	
17	K-166	Clay-type filled section -- Hausen'deckleiste -- Körös takaró idom	-	
18	K-129	Outside moulding section -- Äussere Zwickleiste -- Kúlad díszléc idom	-	
19	K-130	Outside moulding section -- Äussere Zwickleiste' -- Kúlad díszléc idom	-	
20	K-153	Rubber section - lateral windows -- Dichtungsgummi am Seitenfenster -- Oldalaklak tömítögumi	-	
21	MS 1681	Rubber section - windscreen -- Dichtungsgummi zur Windschutzscheibe -- Szélvédő tömítögumi	-	
22	K-154	Plastic backing strip -- Unterlagestreifen aus Kunststoff -- Műanyag alátét csík	-	
23	K-172	Plastic backing strip -- Unterlagestreifen aus Kunststoff -- Műanyag alátét csík	-	
24	K-156	Plastic insert -- Einsatz aus Kunststoff -- Műanyagbetét	-	

1	2	3	4	5
25	J1L,1-8112-000 0111	Door LH drivers cab — Linke Fahrer- re — Vezetőajtó bal	1	
26	J1L,1-8112-000 0111	Door RH driver's cab — Rechte Fahrer- seite — Vezetőajtó jobb	1	

L-XXVI.

Glass panes
Fensterscheiben
Üvegek



L-XXVI.

Fig. No. / Abbr. / Ábra	No. / Sz.	Description / Bezeichnung / Megnevezés	Po. St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
GLASS PANES — FENESTERSCHIEBEN — ÜVEGOK				
1	31L.1-8701-002ra	Windscreen glass — Windschutzscheibe — Szélvédő üveg	2	
2	31L.1-8700-052ra	Glass pane adjacent to windscreen, LH — Seitliche Scheibe, neben der Windschutzscheibe links — Szélvédő melletti üveg bal	1	
3	31L.1-8700-054ra	Glass pane adjacent to windscreen, RH — Seitliche Scheibe, neben der Windschutzscheibe rechts — Szélvédő melletti üveg jobb	1	
4	31L.1-8700-012ra	Service-line casing glass — Glas des Kuraklatschens — Rekládó üveg	2	
5	31L.1-8111-055ra	Ventilation glass pane in driver's door — Karbei Fenster in der Fahrertür — Vezetőajtó szellős üveg	2	

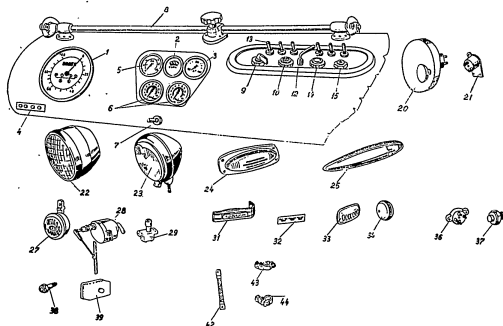
1	2	3	4	5
6	31L.1-8111-036zn	Drop window pane in driver's door — Liftungsfenster in der Fahrertür — Ve — szabadjártó leereszthető üveg	2	
7	31L.1-8700-023zn	Fixed lateral window pane, LH — Fixe seitliche Fensterscheibe links — Fix oldalúveg bal	1	
8	31L.1-8731-006zn	Sliding lateral window pane — Schiebefensterscheibe — Eltolható oldalúveg	14	
9	31L.1-8733-006zn	Sliding lateral window pane — Schiebefensterscheibe — Eltolható oldalúveg	2	
10	31L.1-8734-022zn	Sliding lateral window pane — Schiebefensterscheibe — Eltolható oldalúveg	1	
11	31L.1-8734-015zn	Fixed window pane RH — Fixe seitliche Fensterscheibe rechts — Fix oldalúveg jobb	1	
12	31L.1-8700-018zn	Rear window pane, middle — Hintere Mittel-scheibe — Középső hátfal üveg	1	
13	31L.1-8700-016zn	Rear window pane LH — Hintere Scheibe links — Baloldali hátfal üveg	1	
14	31L.1-8700-017zn	Rear window pane RH — Hintere Scheibe rechts — Jobboldali hátfal üveg	1	
15	31L.1-8700-051zn	Fixed partition glass — Fixe Scheide — válaszscheibe — Fix válaszfal üveg	2	

L-XXVII.

Electrical equipment, instruments and auxiliary devices

Elektrische Ausrüstung

Villamos szerelvények, műszerek



L-XXVII.

Fig. No. / Abb. / Abra	No. / No. / Sz.	Description / Benennung / Megnevezés	Po. / St. / db.	Remarks / Bemerkung / Megjegyzés
1	2	3	4	5
ELECTRICAL EQUIPMENT, INSTRUMENTS AND AUXILIARY DEVICES — ELEKTRISCHE AUSRÜSTUNG — VILLAMOS SZERELVÉNYEK MŰSZEREK				
1	100/100 mm Vb MS 11241	Speedometer — Geschwindigkeitsmesser — Sebességmérő	1	
2	SAFV 30	Fuel gauge — Kraftstoffanzeiger — Füzeltöltényagállás jelző műszer	1	
3	100 kont 1500 MS 11239	Tele-thermometer with 1500 mm conduct — Kuhlwasser-Fernthermometer mit Anschlussleitung von 1500 mm — Hűtővíz távérzékelő 1500 mm-es vezetékkel	1	
4	24 V 2 W RA7e	Pilot light — Kontroll-Lampe — Ellenőrző lámpa	4	
5	10 kont MS 11247	Oil pressure gauge — Öldruckmesser — Kénőlelő manométer	1	
6	PALASV-WJ 250/5	Double-hand air pressure gauge — Doppel-Luftdruckmesser — Kettős légnyomómérő	2	

1	2	3	4	5
7	PFM tip.	Direction indicator switch -- Richtungs- ausgeber -Schalter -- Irányjelző kapcsoló	1	
8	K 152	Windscreen regulator -- Ausleger zum Windschutzscheibe -- Szélvédő kitá- masztó	2	
9	Villtess 64	Lighting switch with lever -- Beleuch- tungs-Armschalter -- Karos világitás kapcsoló	1	
10	Villtess 141	Heater plug pilot filament -- Glühüber- wacher -- Izzító ellenőrző	1	
11	Villtess 59	Switch key -- Stromschalter mit Schlüs- sel -- Kulcsos áramkapcsoló	1	
12	Villtess 25	Heater plug switch -- Glühlanasschalter -- Izzítókapcsoló	1	
13	PFM tip.	Lighting tumbler switch -- Beleuchtungs- schalter -- Világításkapcsoló bil- lens	6	
14	Villtess tip.	Battery main switch button -- Batterie- Hauptschalterknopf -- Telepkikaposo- ló gomb	1	
20	Villtess 52	Battery main switch -- Batterie - Haupt- schalter -- Telepkikapcsoló	1	

1	2	3	4	5
21	Villtess 56	Mechanical braking signal switch -- Schlussleuchteschalter -- Mechanikus Tárlámpa kapcsoló	1	
22	PFM 170	Head light -- Scheinwerfer -- Főfény- szóró	2	
23	PFM 425 288	Fog light -- Nebelscheinwerfer -- Köd- fényesztő	2	
24	K-146	Roof light -- Deckenleuchte -- Mennye- zetlámpa	9	
24a	K-146-1	Roof light globe -- Glas zur Decken- leuchte -- Mennyezeti lámpa burka		
24b	K-146-3	Roof light socket -- Fassung zur Decken- leuchte -- Mennyezeti lámpa foglalat		
24c	K-161-14	Pad to roof light globe -- Unterlage zum Deckenleuchtenglas -- Alátét a meny- yezeti lámpa burához		
24d	K-146-2 288	Roof light casing -- Leuchtenverklei- dung -- Lámpaburkolat		
24e	K-146-16 12 OKe-120F 2870 Msz 18433	Casing pad -- Bellige zur Verkleidung -- Burkolat alátét		
-		Storage battery -- Akkumulator -- Ao- cumulátor telep	2	

1	2	3	4	5
25	SA73-7202-000	Position light — Stellungslight — Helyzetjelző lámpa	4	
27	AVM-KUB	Horn — Horn — Kürt	1	
28	FAL 24 V	Windscreen wiper motor — Schelbenwi- scher-Motor — Ablaktörző motor	2	With 60 mm back piece — Mit 60 mm hátsó nyakkal
29	Willtex 10	Stop switch pedal — Abblendflusshalter — Működési lámpacsatló	1	
31	DL1.1-9514-000	Stop-tail lamp Végféklámpa — Schlussscheinleuchte	2	
32	DL1.1-9513-000	Number-plate lamp — Nummernlicht — Rendszámvilágító test	1	
33	DL1.1-9512-000	Flash light — Blinklight — Villogó lámpa	2	
34	FFM 24 V	Buzzer — Sumner — Kérszengő	1	
36	Willtex 55/b 24 V 40 W	Bimetal switch — Bimetal — Bimetal	1	
37	Willtex 98	Buzzer push-button — Sumnerbetätigung — Öszengőnyomógomb	3	
38	Willtex 63	Plug socket — Steckdose — Dugaszalj	1	

1	2	3	4	5
	FFM			
39	MS 14591 VI	Fuse box — Sechstellige Sicherungsbox — Hatrészes biztosíték doboz	3	
39a	15A MS 14593	Fuse — Sicherung — Bistositék	18	
42	32x10x0,2	Flexible strap — Masseband — Fell- bills kábelcsővet	1	
43	A-213-54	Cable terminal, positive — Batterie- Klemme, positiv — Kábelcső pozitív	2	
44	B-213-54	Cable terminal, negative — Batterie- Klemme, negativ — Kábelcső negatív	2	
	Tungram 24 V 2 W	Warning lamp bulb with bayonet socket /BA 7/4S — Kontrollampe mit Fassungs- — sziften /B A 7/4 S — Csapszáras foglalatú ellenőrző lámpa /BA 7/4 S	10	
	Tungram 1586 BA 20x 24 V 35/35 W	Double filament bulbhead lamp — Bilux- Glühlampe — Bilux lámpa	2	
	Tungram 1130 BA 20x 24 V 50 W	Fog lamp bulb — Nebelleuchte — Glüh- birne — Ködlámpa lámpa	2	
	Tungram 2617 24 V 5 W	Widjet bulb BA 15x — Kleins-Glühlampe /B A 15x / — Cseresznyevízeső BA 15x	8	
	Tungram 7520 24 V 5 W	Pestoon lamp bulb — Röhrenlampe — Soffita égő	15	

1	2	3	4	5
Tungesam 7521 24 V 10 W	Festoon lamp — ta 4g6	Röhrenlampe — Soffl-	2	
Tungesam 6582 24 V 10 W	Tube lamp —	Röhrenlampe — Cs66g6	20	
Tungesam 1115 24 V 15 W	Ball lamp BA 15 — G6ab6g6 BA 15	Kleinlampe B A 15	6	

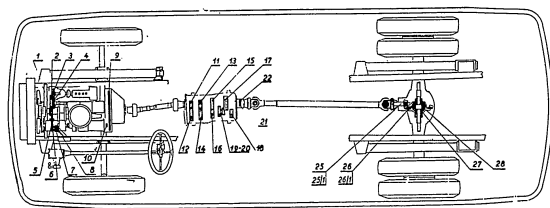
L-XXVIII.

Tabulated chart of the anti-friction bearings
Tabelle der Wälzlager
Gördülcspagyak táblázata

TABULATED CHART OF THE ANTI-FRICTION BEARINGS									
TABELLE DER WÄLZLAGER									
GÖRDÜLŐCSAPÁGYAK TÁBLÁZATA									
Plate XVIII. IXVIII. Tafel IXVIII. Tábla									Ik. 306 Egyptian Ik. 306 Ägyptischer Ik. 306 Egyiptoni
Unit Verwendungs- stelle Alkalmazási hely	Place of mounting Montagestelle des Lagers A csapágy szerelési helye	Type Typ des Lagers A csapágy típusa	Mark of the bearing -- Bezeichnung des Lagers -- A csapágy jele MSz, DIN or drawing No. MSz, DIN oder Zeichen-Nr. MSz, DIN vagy rajzsám	Dimensions in mm - Méretek mm - ben			Fr. St. db.	Remarks Bemerkung Megjegyzés	
Engine	Compressor Luftkompressor Légcsúrtító	Single-row ball bearing Hochschultriges Kugellager Egysorú mállyhornyu gölydscsapágy	61305 MSz 7613	-	25	62	17	2	
		Needle roller Nadelrollenlager	3x15,8 MSz 7873	-	-	-	-	42	
Motor	Fan shaft -- Ventilatorachse Ventilátor tengely	Radial single-row ball bearing Hochschultriges Ringagullager Mállyhornyu gyűrűs gölydscsapágy	61205Z MSz 7612	6205Z	25	52	15	1	No. 9, Plate III, III. Tafel, Pos. 9, III. tábla 9. t.
Motor	Crankshaft -- Kurbelwelle Forgattyús tengely	Roller cage -- Rollerkranz Görgökösoszor	61304Z MSz 7613	6304Z	20	52	15	1	III/7
	Oil pump intermediate gear bearing -- Nellenlagerung des Öl- pumpen-Zwischenrades -- Olajszel- észtény kerekek közötti tengelycsapágy	Radial single-row ball bearing Hochschultriges Kugellager Mállyhornyu gölydscsapágy	61202 MSz 7612	6202	15	35	11	2	III/55
			6202Z MSz 7612	6202Z	15	35	11	1	V/6
			61202 MSz 7612	6202Z	17	40	12	1	V/4
Clutch Kupplung Tengelykap- csoló	Disengaging sleeve Ausrückstulpe Kinycső karanytu	Radial ball bearing with pressure plate and cap. compl. -- Komplettes Hochschultriges Kugellager mit Druckscheibe und Kappe -- Málly- hornyu gölydscsapágy nyomólaptal és fedővel együtt.	51210 MSz 7512 51210 MSz 7512	6010	50	80	16	1	IX/22
Speed change box Getriebe Sebességvál- tómű	Speed change box Getriebe Sebességváltómű	Single-row ball bearing Hochschultriges Kugellager Mállyhornyu gölydscsapágy	61213 MSz 7612	6213	65	120	23	6	XI/5
			61311 MSz 7613	6311	55	120	19	1	XI/28
Propeller shaft Kardánszelle Kardántengely	Universal cross -- Gelenke - kreuze -- Kardánkeresztiek	Bearing roller -- Lagerrolle Csapágygörgő	380.1.31.59					216	XIV/8
		Bearing roller -- Lagerrolle Csapágygörgő	2,5x19,8 DIN 617						304
Rear axle differential carrier Hinterachs- differenzial- gehäuse Hátsó tengely- különválós- ház Hátsó tengely- különválós- ház	Driving level pinion Antrieb - Kegelrad Hajtókupkerék	Cylindrical roller bearing -- Zylinderrollenlager -- Szegez- sörgörgőcsapágy	NJ 2207 DIN 5412					1	XVI/9
	Differential gear housing Ausgleichsgehäuse -- Gehäuse Differenzialműház	Taper roller bearing Kegelrollenlager Kúpgörgőcsapágy	31310 MSz 7313	30310	50	110	27	2	XVI/11
Front axle Yorgprache Mielőli tengely	Wheel hub -- Radnabe Kereksúly		32216 MSz 7322	32216	80	140	33	2	XVI/40
			30215 MSz 7302	30215	75	130	27	2	XV/26
Steering Lenkung Kormánytű	Steering worm -- Lenkachsenke Kormányoszele		32216 MSz 7322	32216	80	140	33	2	XVI/28
	Steering roller -- Lenkrolle Kormánygörgő		32211 MSz 7322	32211	55	100	26,5	2	XVIII/25
			32208 MSz 7321	32208	40	90	33	2	XVIII/32
			30207 MSz 7302	30207	35	72	18	2	XX/5
		Needle roller -- Nadelrolle Tüggörgő	3x11,8 MSz 7873	-	-	-	-	48	XX/30

L-XXIX.

Tabulated chart of the toothed wheels
Tabelle der Zahnräder
Fogaskerekek táblázata



L-XXIX.

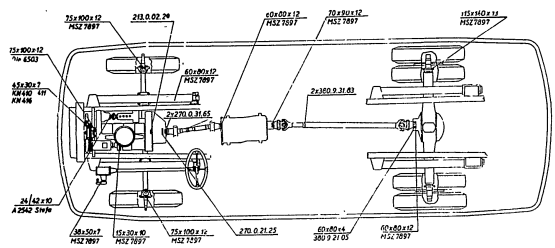
TABULATED CHART OF THE TOOTHED WHEELS								
TABELLE DER ZÄHNRADER								
FOGASKERKEKTÁBLÁZATA								
No. / Sr.	Unit / Montagesstelle	Description / Benennung	Drawing No. / Zeichnungsnummer	Tooth Number / Zahnzahl	Module / Modul	Pc. St. / Db.	Remarks / Bemerkung	
1.	Motor	Crankshaft timing gear -- Steuerungszahnrad -- Vezérműhajtó fogaskerék	413.9.02.27	32	3	1	Plate III item 70 III. Taf. Pos. 70, III/70	
2.		Intermediate gear to the compressor and injection pumps -- Zwischenrad zum Luftpumpen- und Einspritzpumpe -- Közbenső kerék a légturító és befecskendező szivattyúhoz	413.9.05.19	37	3	1	IV/40	
3.		Compressor and injection pump driving gear -- Zahnrad zur Einspritzpumpe und zum Luftpumpen -- Fogaskerék a befecskendező szivattyú és a légturítóhajtáshoz	413.9.13.17	37	3	1	IV/52	
4.		Camshaft timing gear -- Steuerungsantriebsrad -- Vezérműhajtókörök	413.9.05.18	64	3	1	IV/41	
5.		Intermediate gear to the oil pump -- Zwischenrad zur Ölpumpe -- Meghajtó fogaskerék az olajszivattyúhoz	413.9.07.66	24	3	1	V/29.59	
6.		Oil pump driving gear -- Antriebszahnrad zur Ölpumpe Meghajtó fogaskerék az olajszivattyúhoz	413.9.07.05	32	3	1	V/57	
7-8.		Oil pump gear -- Zahnrad zur Ölpumpe -- Olajszivattyú fogaskerék	413.1.07.39.35	10	3,45	2	V/51	
9.		Starter ring gear -- Anlasserzahnkranz -- Indítófogaskoszorú	413.1.02.39	145	3	1	III/55	
10.		Starter pinion -- Zahnrad am Anlasser Fogaskerék az indítómotoron	IM1 - PK 11/12	9	3	1		
11.		Gear Box Getriebe Sebességváltó	Primary shaft helical gear -- Kupplungswelle mit Schräggrad Nyelés tengely ferdefogású kerékkel	UG - 2634a 2634a	25	3	1	XI/1
12.	Helical gear on the layshaft -- Schräggrad an der Vorgelege- welle -- Ferdefogású fogaskerék az előtétengelyen		UG - 838/b	47	3	1	XII/7	
13.	Helical gear for 2nd speed -- Schräggrad zum III. Gang -- Ferdefogású kerék a III. sebességhez		UG - 2634a 2634a	33	3	1	XI/14	
14.	Helical gear for III. speed on the layshaft -- Schräggrad zum III. Gang an der Vorgelegewelle -- Ferdefogású fogas- kerék a III. sebességhez az előtétengelyen		UG - 839/b	39	3	1	XII/6	
15.	Helical gear for the 2nd speed -- Schräggrad zum II. Gang -- Ferdefogású fogaskerék a II. sebességhez		UG - 834/ #b	44	3	1	XI/17	
16.	Helical gear for the 1st speed -- Geradverzahntes Zahnrad zum I. Gang -- Egyenesfogású fogaskerék a I. sebességhez		UG - 851/b	28	3	1	XII/4	
17.	Spur gear for the 1st speed -- Geradverzahntes Zahnrad zum I. Gang -- Egyenesfogású fogaskerék a I. sebességhez		UG - 826/c	40	4,0833	1	XI/20	
18.	Layshaft -- Vorgelegewelle -- Előtétengely		UG - 26315/B	15	4,0833	1	XII/1	
19-20.	Double reverse gear -- Doppelsahnrad zum Rückwärtsgang Kétféle fogaskerék látracsúsz sebességhez		UG - 829 /#a	22/17	4,0833	1	XII/13	
21.	Speedometer driving worm gear -- Antriebsrad des Geschwin- keitsmessers -- Sebességmérő meghajtó kerék		UG - 26379 /#a	11	1,5	1	XI/29	
22.	Speedometer driven pinion -- Antriebsritze des Geschwin- keitsmessers -- Sebességmérő meghajtó kiskerék		UG - 26380/a	18	1	1	X/36	
25-26.	Able housing Hülsenbrüche Hásház		Driving bevel pinion and crown gear /Oerlikon-type toothing/ -- Antrieb-kegelrad und Tollerrad /Oerlikon Verzahnung/ Hajtó kupkerek és tányérkerék /Oerlikon fogású --	450.0.32.17 450.0.32.95	7/36	6,9028	1 pair 1 pair	XVI/10-30
25/26/1.			Driving bevel pinion and crown gear /Oerlikon-type toothing/ -- Antrieb-kegelrad und Tollerrad /Oerlikon Verzahnung/ Hajtó kupkerek és tányérkerék /Oerlikon fogású --	450.0.32.105 450.0.32.106	7/41	6,07 6,7	1 pair 1 pair	XVI/10/1- 30/1
27.			Differential bevel sun gear -- Grosses Ausgleichkegelrad -- Nagy kiegyenlítő kupkerek	380.9.32.141	18	6,5	2	XVI/38
28.			Bevel planetary pinion -- Kleines Ausgleichkegelrad -- Kis kiegyenlítő kupkerek	180.0.32.14	11	6,5	4	XVI/36

L-XXX.

Tabulated chart of flanged sealing rings and
felt gaskets

Tabelle der Wellendichtungen und Filzdich-
tungen

Karmantyús tömítőgyűrűk és nemeztömítések
táblázata



L-XXX.

TABULATED CHART OF FLANGED SEALING RINGS AND FELT GASKETS TABELLE DER WELLENDICHTUNGEN UND FILZDICHTUNGEN KARMANTYUS TÖMITŐGYŰRŰK ÉS NEMEZTÖMITÉSEK TÁBLÁZATA						
Unit Verwendungs- stelle Alkalmazási hely	Place of mounting Montiergestelle Szerelési hely	Description Bezeichnung Megnevezés	Dimensions Maß Méretek	Drawing or standard number Zeichen- oder Norm- nummer Rajz, v. szabványszám	Pc. St. Db.	Remarks Bemerkung Megjegyzés
MOTOR	Compressor Luftkompressor Légűrlítő	Flanged sealing ring -- Wellendichtung Karmantjus tömitőgyűrű	24/ 42x10	A2542 Stefa		
	Fan -- Lüfter Ventillátor	Gasket, complete -- Komplette Dichtung -- Teljes tömités	45x21 45x20x7	KN 410-411 KN 416	1	III/12
	Front cover Vordereckel Mellő fedél	Flanged sealing ring -- Wellendichtung Karmantjus tömitőgyűrű	A 75 x 100	MSz 7894	1	I/3d
	Crankshaft Kurbelwelle Forgatótűs tengely	End bush, complete -- Verschlussbüchse komplett -- Zárpérsely, teljes		213.0.02.29	1	III/54
	Water pump Wasserpumpe Vízszivattyú	Flanged sealing ring -- Wellendichtung Karmantjus tömitőgyűrű	15 x 30 x 10	MSz 7897	1	V/8
Clutch Kupplung Tengelykapcsoló	Throwout bearing Ausprücklager Kinyomócsapágy	Flanged sealing ring Wellendichtung Karmantjus tömitőgyűrű		270.0.21.25	1	
Speed - change box -- Getriebe Sebességváltó	End cover Abschlussdeckel Zárófedél	Flanged sealing ring -- Wellendichtung -- Karmantjus tömitőgyűrű	60 x 80 x 12	MSz 7897	1	I/2
Propeller shaft Kardanwelle Kardántengely	Splined flange Nutfansch Hornycs perem	Sealing disc -- Dichtungsscheibe Tömitőtárcsa	32,5 x 57 x 5	270.0.31.65	2	XIV/12
	Splined flange Nutfansch Hornycs perem	Sealing disc -- Dichtungsscheibe Tömitőtárcsa	60 x 80 x 12	380.9.31.83	2	XIV/29
Rear axles Hinterachsbrücke	End cover Abschlussdeckel Zárófedél	Felt ring -- Filzring -- Nemezgyűrű	60 x 80 x 4	380.9.21.05	1	XVI/21
Hátsóhid	Wheel hub Radnabe Kerekagy	Flanged sealing ring Wellendichtung	60 x 80 x 12	MSz 7897	1	XVI/20
	Wheel hub Radnabe Kerekagy	Flanged sealing ring Wellendichtung	115 x 140 x 13	MSz 7897	2	XV/32
Front axle Vorderachse Mellő tengely	Wheel hub Radnabe Kerekagy	Karmantjus tömitőgyűrű	75 x 100 x 12	MSz 7897	2	XVIII/23
Steering Lenkung Kormányrúd	Bearing collar Lagerflansch Csapágyperem		38 x 50 x 7	MSz 7897	1	IX/23