WORKSHOP MANUAL
moped model 210

This workshop manual is intended primarily for all repair shops and their workers concerned with repairs of our model 210 moped. It does not contain servicing jobs and repairs described in the Rider's Manual but only repairs for which special assembly tools and jigs are required.
The purpose of this manual is to facilitate the work of the repairmen and to improve servicing of our products. Any changes and deviations from standard procedure? will be announced in our Service Bulletins.

ZVL concern
Povazske strojarne
Klementa Gottwalda works
sales and technical service
department

CONTENTS

I. MOPED SPECIFICATIONS

Engine type	air cooled, two-stroke single-cylinder unit
Swept volume	49 cc
Cylinder bore x piston stroke	39 x 41 mm
Engine power output	1.75 kW at 5,000 rpm ± 8 %
Clutches	automatic, dry, centrifugal
Gearbox	two-speed unit
Engine to rear wheel transmission ratio	1st. speed overall ratio ----- 1 : 24.4231 2nd. speed overall ratio ----- 1 : 13.7305
Primary transmission	indented belt
Secondary transmission	link chain
Pedal drive transmission ratio	1 : 0.692
Pedal-actuated starting gear	overall ratio 1 : 0.0504
Front suspension	telescopic fork without shock absorbers -- 60 mm stroke
Rear suspension	telescopic suspension units without shock absorber -- 60 mm stroke
Brakes	internal expanding shoe -- brakes controlled by levers on handlebars
Brake dimensions	85 x 20 mm
Tyres	2¼ x 16"
Wheels	*1.60" (WH1) x 16"*
Inflation pressures ------ front tyre	196 kPa (2 atm) *[28 psi]*
------ rear tyre	245 kPa (2.5 atm.) *[36 psi]*
Moped dry weight	51 kg
Moped running weight	54 kg
Road speed --- sustained	35 km/hr.
--- maximum	40 km/hr ± 5 %
Fuel tank filling capacity	4 litres
Fuel reserve	0,7 litres
Maximum climbable gradient with rider weighing 75 kg	25 %
Noise	70 decibels
Ignition system	6 volt, contactless with semiconductor elements
Spark plug	PAL N 7 R *[Champion L89CM L85 L86]* *[NGK B6HS Bosh W7AC]*
Headlamp	6 v 21 w
Tail lamp	6 v 5 w
Speedometer lighting	6 v 2 w
Fuel consumption	1 3 litres/100 km at 27 km/hr
Load capacity, maximum	90 kg including 5 kg luggage on carrier

Note:
When exceeding the load capacity, it is necessary to decrease the maximum speed proportionally.

Tightening Torques of Screws, Bolts and Nuts
Engine.

Tightened part	Thread dimension mm	Tightening torque Nm
Engine (crankcase) covers	6	8
Cylinder head	6	7
Starting clutch	10	25
2nd-speed clutch drum	10	20
Frame		
Steering head nut	12	40
Handlebars	6	10
Front wheel spindle	12	50
Rear wheel spindle	12	50
Engine fastening screws	8	30
Saddle	8	30
Pedals	14	65
Pedal crank	6	10
Rosette	6	19

LOCATION OF MOPED SERIAL No.
a) on steering head
b) on right-hand bottom side of engine

IGNITION ADVANCE
1 to 1.5 mm before piston top dead centre (TDC)

FUEL — OIL/PETROL MIXING RATIO

1:25 during running-in period
1:33 after running-in period

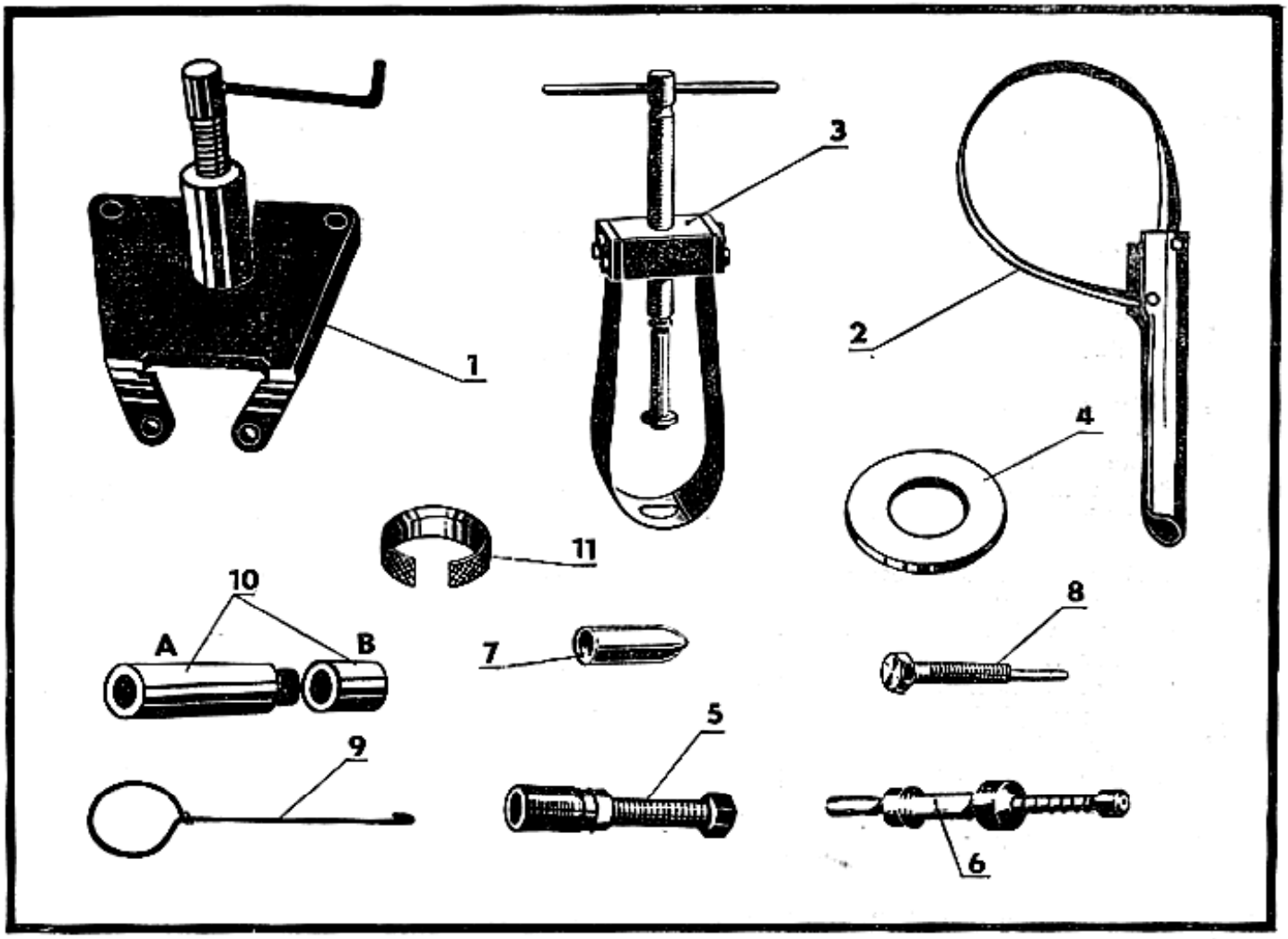
WHEN ORDERING SPARE PARTS, INDICATE THE YEAR OF MANUFACTURE AND ENGINE No.

II. GENERAL TECHNICAL DATA

1. Assembly tools and jigs (Fig. 1)

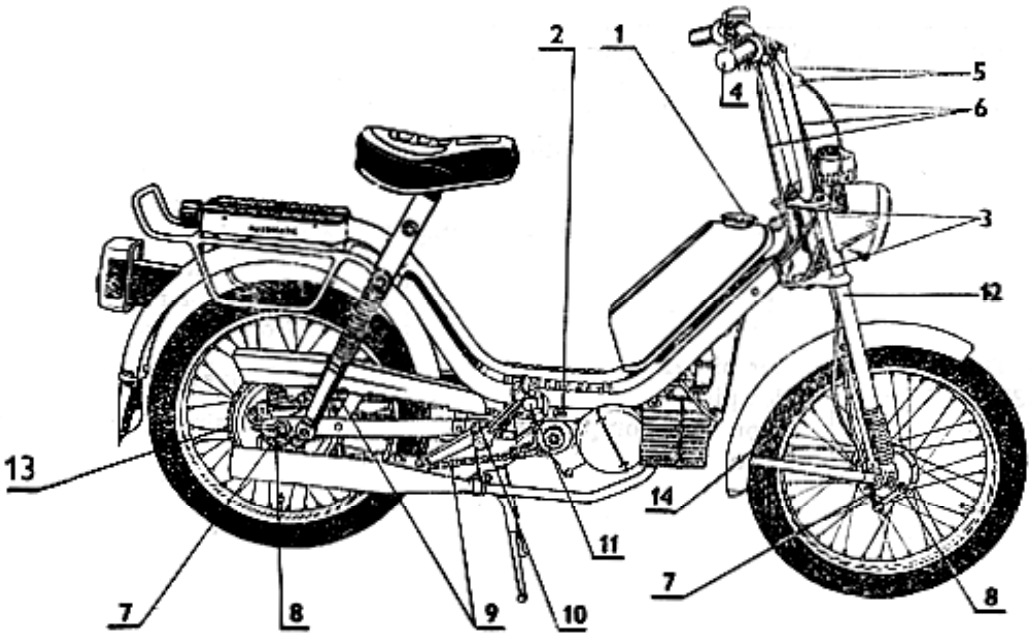
Ord. No.	Proprietary No.	Name	Use
1	3T 210-10 000-14.5	Crankcase halves separator	Engine dismantling
2	928-1000-1.5	Clutch drum retaining jig	Clutch drum loosening
3	50-1200-1.1	Gudgeon pin drift	Gudgeon pin removal and reinstallation
4	4T 210-2100	Starting clutch compressor	Starting clutch removal and reinstal lation
5	4T 210-2200-01	Clutch drum drag	Clutch drum removal
6	975-1400-1.1	Ignition advance gauge	Advance adjustment
7	4T 928-1200-01.03	GUFERO sealing ring installer	Protection of GUFERO sealing ring during installation
8	928-6000-1.1	Rotor drag	Alternator rotor removal
9	MN 1100-7.1	Hook	Installation of starting clutch springs
10	4T 928-1200-01.4 4T 928-1200-01.5	Pilot pin-A Pilot pin-B	Piston removal and reinstallation
11	4MT 28-1000-1 2	Piston ring compressing sleeve	For compressing piston rings on instal-lation

Fig. 1



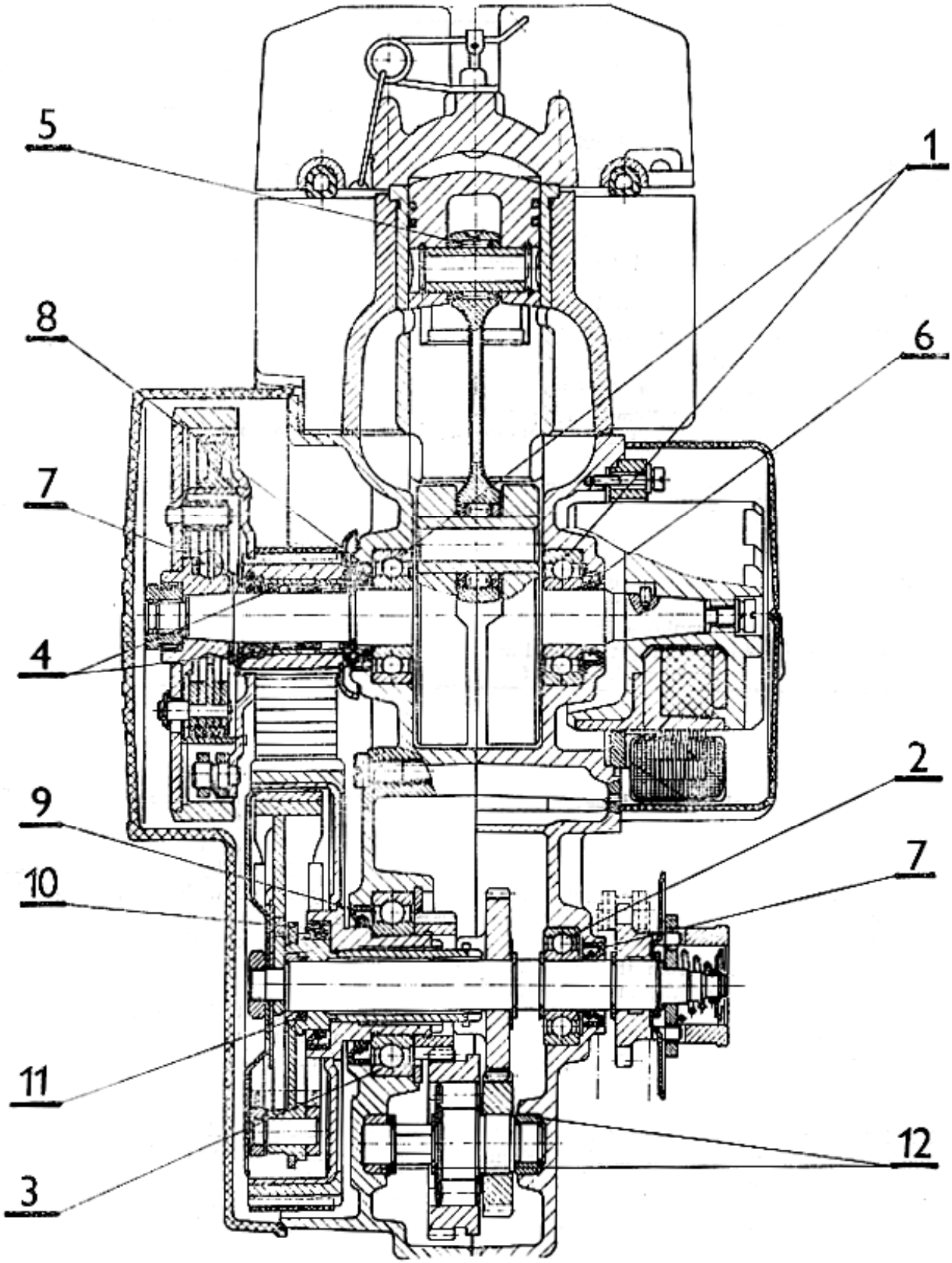
2. Moped Lubrication — Lubrication Chart (Fig. 2)

Fig. 2



Pos. No.	Lubricated part	Lubricant	Note
1	**Engine**	Oil for two-stroke engines — SAE 30 (M2T)	Permanent lubrication with oil admixed with petrol at a ratio of 1:33 (1:25 during running in).
2*	**Gearbox**	Engine oil — SAE 30 (M6A)	Filling — 0.06 litres.
3	**Steering**	Bearing grease (AV 2)	Wash dismantled parts and smear them with grease
4	**Twistgrip**	Lubricating grease (A00)	After washing, apply grease on sliding parts.
5	**Brake levers**	Oil SAE 30 (M6A)	
6	**Bowden cables**	Thin oil (graphited)	Drip into bowden tubings.
7	**Wheel bearings**	Bearing grease (AV2)	Top up grease filling in bearings.
8	**Brake cam pins, brake cams, brake-shoe pivots**	Lubricating grease (A00)	After cleaning, coat sparingly with grease.
9	**Chains, sprocket**	Graphited oil, grease (A00)	Lubricate after cleaning.
10	**Pedal shaft**	Oil SAE 30 (M6A)	
11	**Pedal shaft bearings**	Oil SAE 30 (M6A)	
12	**Front telescopic fork (legs)**	Oil SAE 30 (M6A)	
13	**Coaster pinion**	Oil SAE 30 (M6A)	
14	**Speedometer drive cable**	Thin graphited oil	Drip into bowden tubing.

*) To ensure safe function of the freewheel at very low temperatures, it is recommended to use the M3A oil (thinner).



3. List of Bearings, Sealing Rings, and Bushes (Fig. 3)

Pos. No.	Catalogue Part No.	Name	Dimension mm	Quantity
		Engine bearing		
1	324 162 030 003	Bearing No. 6203/C3	17 × 40 × 12	2
2	324 162 020 003	Bearing No. 6202/C3	15 × 35 × 11	1
3	324 165 060 003	Bearing No. 6006/C3	30 × 55 × 13	1
4	324 592 523 149	Needle bearing	K 15 × 19 × 13 INA	2
5	324 931 029 053	Needle rollers-connectingrod small end	Dia. 2 × 8	25
		Wheel bearings		
	324 165 010 000	Bearing No. 6001	12 × 28 × 8	4
		Steering		
	324 912 050 052	Recirculating ball, 5	Dia. 5	42
		Sealing rings in engine		
6	273 521 003 517	GUFERO shaft sealing ring	17 × 28 × 7	1
7	273 521 002 617	GUFERO shaft sealing ring	15 × 24 × 7	2
8	273 521 005 317	GUFERO shaft sealing ring	22 × 32 × 7	1
9	273 521 009 517	GUFERO shaft sealing ring	35 × 47 × 7	1
10	273 521 007 617	GUFERO shaft sealing ring	28 × 38 × 7	1
11	273 111 010 104	Sealing ring	Dia. 19 × 15	1
	273 111 010 024	Sealing ring	Dia. 9 × 5	1
	273 111 526 025	Sealing ring	Dia 8 × 2	1
		Crankcase bushes		
12	451 9 224 11 018	Bush, right — hand and left hand crankcase half	Dia 12 × 18 × 8	2

4. Engine Torque Transmission - Diagram (Fig. 4) and Description

Gearbox
The diagram of the two-speed automatic transmission is shown in Fig. 4.

The torque is transmitted from the crankshaft (1) to the gears (2—2') over the starting clutch (B) by an indented belt.

1st-speed gearing:

It is formed by two pairs of involute spur gears (3, 4, 5 and 6) meshing with the freewheel (D) between the gears (4) an(5) on the layshaft. From the gear (6), the torque is transmitted over a force closed mechanism to the output shaft (7) and the rear wheel by means of the secondary transmission chain.

2nd-speed gearing:

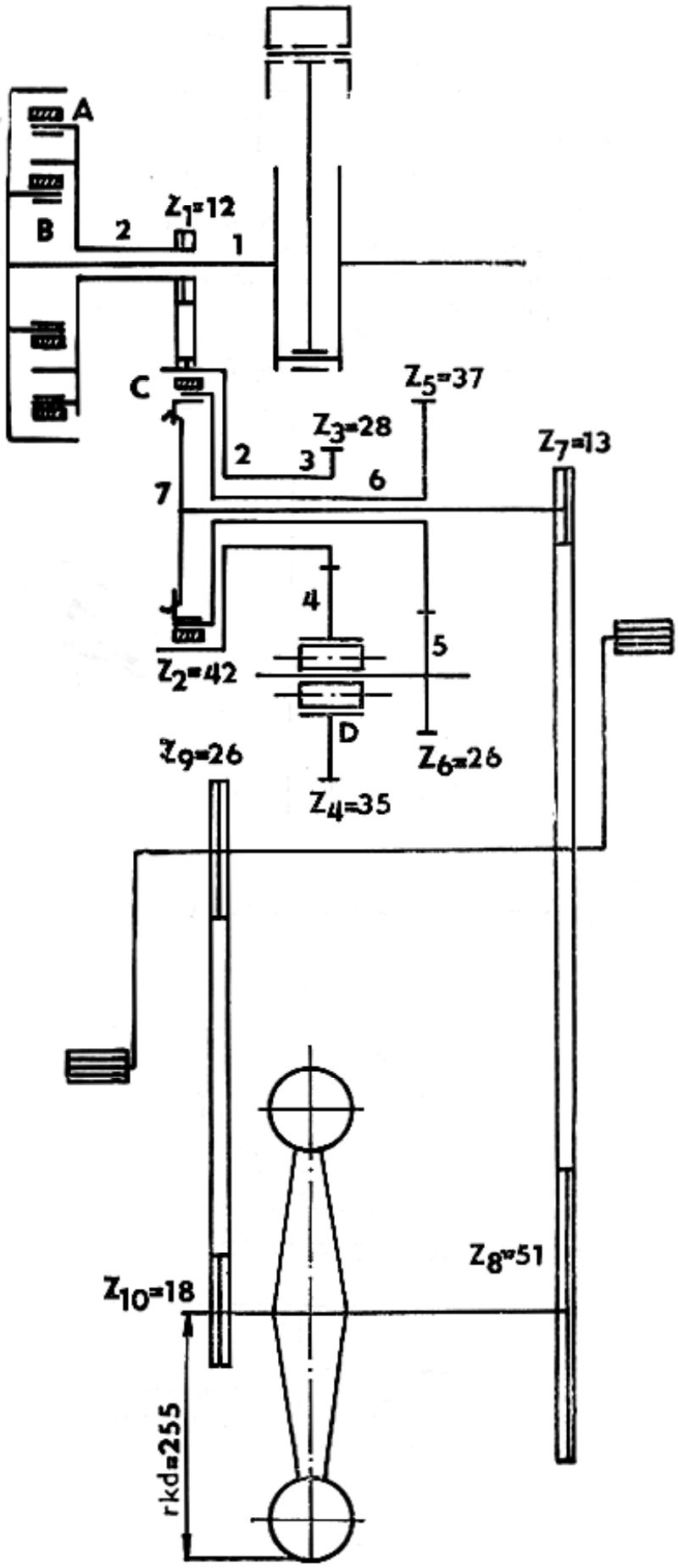
Parts (3), (6), and (7) are coupled with the clutch (C) so that they run at the same speed. The running of the layshaft gears (4) and (5) at different speeds is enabled by the freewheel (D). The gear change is effected by the automatic centrifugal clutch (C) provided with two shoes of the leading type. The operation of this clutch is controlled by force closing between the parts (2'), (6) and (7)

From the output shaft (7), the torque is transmitted to the rear wheel by means of secondary transmission.

The force-closed clutch engages the respective gear depending on the road speed, the drive taken off the automatic transmission, the acceleration and deceleration, and the rolling resistance of the vehicle in terrain

The output shaft (7) with the gear-change mechanism runs in two ball bearings. The layshaft is supported by two bronze bushes.

Fig. 4



III ENGINE

1. Removing engine from frame

a) Remove the engine guards.
b) Detach the spark plug cable, the fuel hose, and the throttle cable.
c) Disconnect the leads of the electrical equipment.
d) Disconnect the chain of the secondary transmission.
e) Disconnect the exhaust pipe from the engine.
f) Remove screws fastening the engine to the frame, and lift off the engine.

Clean well the surfaces of the engine, and drain the oil from the automatic transmission case. During engine dismantling, clean immediately all the removed parts and put them aside in the order of their removal, so that they can be reassembled correctly and in the shortest possible time.

2. Removing cylinder head, cylinder and piston

a) Unscrew the four M6 nuts and lift them off together with washers from the studs.
b) Remove the cylinder head.
c) Remove the cylinder (Fig. 5)
d) Remove the circlips securing the gudgeon pin and use the drift No. 50-12000-1.1 (Fig. 6) to drive out the gudgeon pin.

Take care not to spill the dia.. 2 x 8 mm. Needle rollers of the gudgeon pin (there are altogether twenty five). The maximum permissible ring gap of a worn piston ring is from 0.6 mm to 0.8 mm.

Check the dimension for grading the pistons in the individual classes 34.5 mm. From the piston base (Fig. 7)

Fig. 5

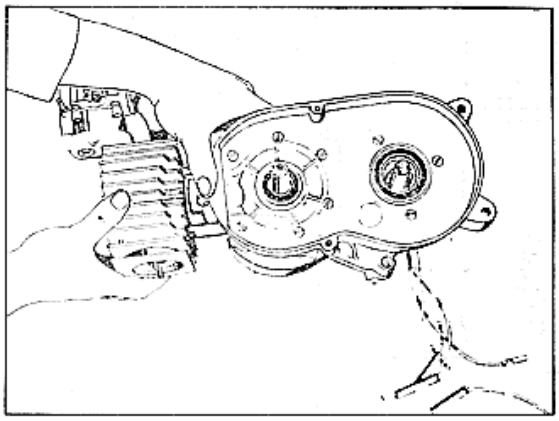
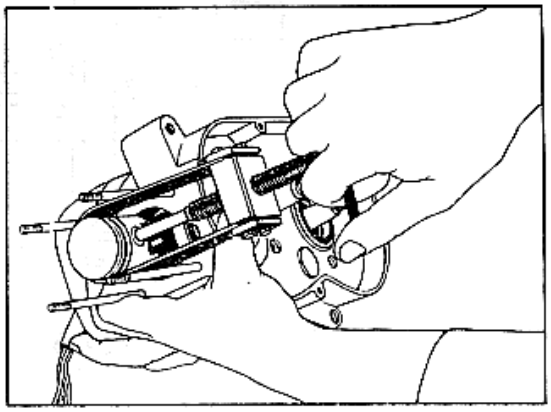


Fig. 6



3. Grading of Cylinders and Pistons

CYLINDER CLASSIFICATION TABLE

Cylinder class	A	B	C
Normal /standard/	39.01+0.005	39.015+0.010	39.025+0.010
1 st rebore	39.26+0.005	39.265+0.010	39.275+0.010
2 nd rebore	39.51+0.005	39.515+0.010	39.525+0.010
3 rd rebore	39.76+0.005	39.765+0.010	39.775+0.010
4 th rebore	40.01+0.005	40.015+0.010	40.025+0.010

PISTON CLASSIFICATION TABLE

Piston class	A	B	C
Normal /standard/	38.950-0.01	38.960-0.01	38.970-0.01
1 st rebore	39.200-0.01	39.210-0.01	39.220-0.01
2 nd rebore	39.450-0.01	39.460-0.01	39.470-0.01
3 rd rebore	39.700-0.01	39.710-0.01	39.720-0.01
4 th rebore	39.950-0.01	39.960-0.01	39.970-0.01

Fig. 7

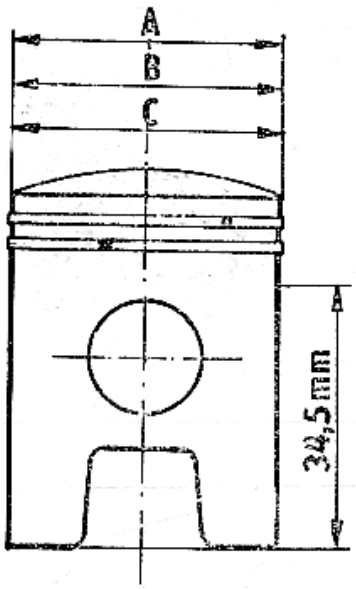


Fig. 8

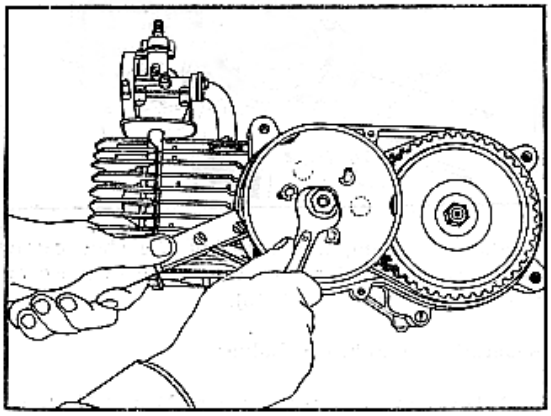
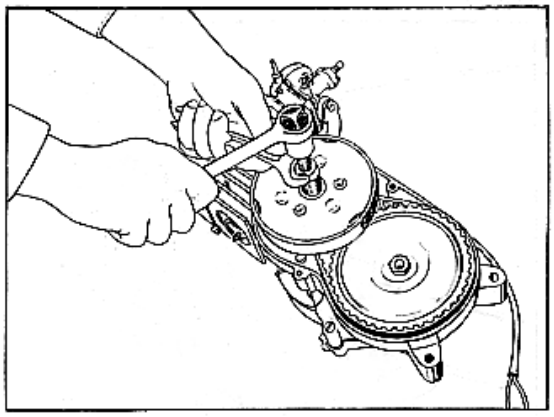


Fig. 9

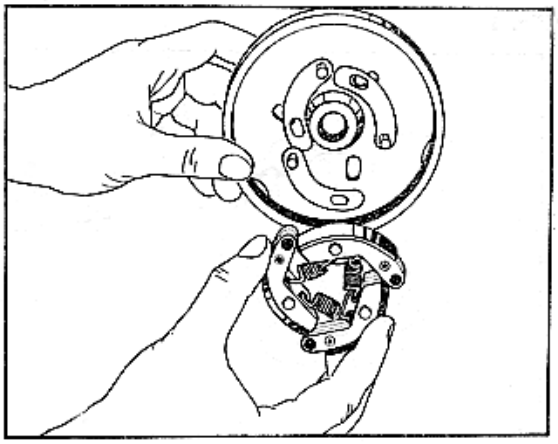


4. Clutch Dismantling

After removing two M 5 x 30 screws, lift off the left-hand clutch cover.

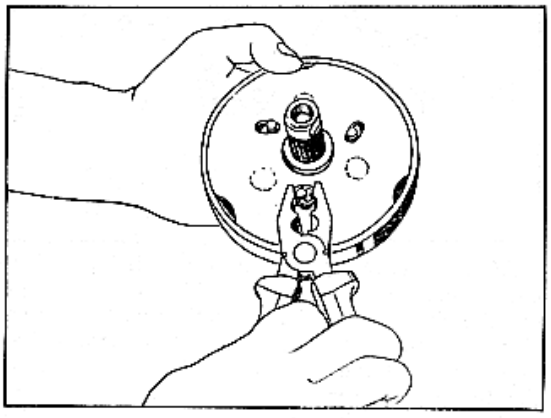
Using the clutch drum retaining jig No. 928-1000-1.5 retain the starting clutch drum and loosen the nut with the spanner No. 17 (Fig. 8). Pull off the clutch drum using the drag No. 4T 210-2200-01 (Fig. 9). With a screwdriver remove three circlips from the recesses to loosen the clutch starting shoes (Fig. 10)

Fig. 10



For re-assembly use the washer No. 4T 210-2100 and clutch drum drag No. 4T 210-2200-01 and secure the clutch with the circlips (Fig. 11).

Fig. 11



After having removed the drum with starting shoes, rotate and gently pull the starting drum with the sma11 pulley to remove it together with the indented belt.
Work carefully so as not to damage the needle bearings and washers.

For the removal and refitting of the starting shoes use the jig (hook) No. MN 1100-7.1 (Fig. 12) or flat pliers.

Loosen the nut of the drum housing the change gear shoes with the spanner No. 17 while holding the output shaft with the spanner No. 10 on the side of the drive (power take-off) gear to prevent its rotation. It is recommended to put the engine on the work bench with the ignition side down to prevent the oil from getting into the 2nd-speed clutch drum.

Fig. 12

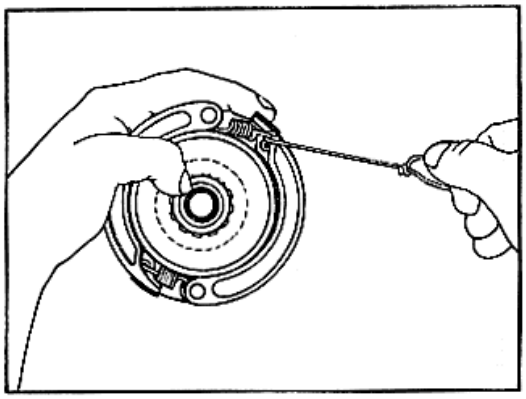
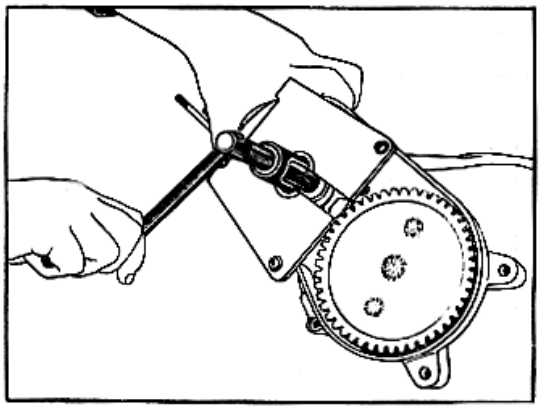


Fig. 13



After unscrewing the nut and lifting off the cover, remove the circular packing piece and pull out the change-gear shoes together with their carrier (backing plate) using two thin screwdrivers braced against the inner edge of the drum. Insert the tips of the screwdrivers under the top arms of the shoe near the pivots and opposite each other. By carefully pushing the screwdriver handles downward you will lift the carrier with the shoes out of the drum.

Wipe the oil off the parts immediately and put the parts in a clean place. If the drum or the shoe linings are stained with oil, they have to be degreased thoroughly. Finally remove the drum of the change-gear clutch.

Fig. 14

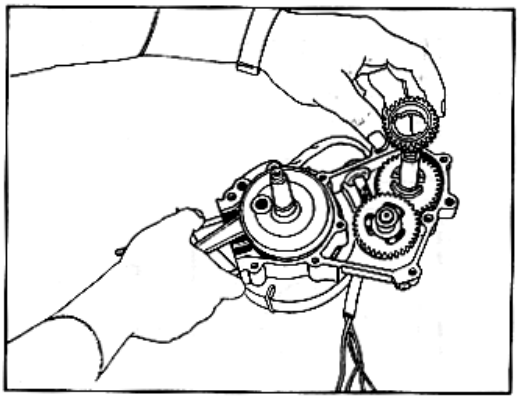
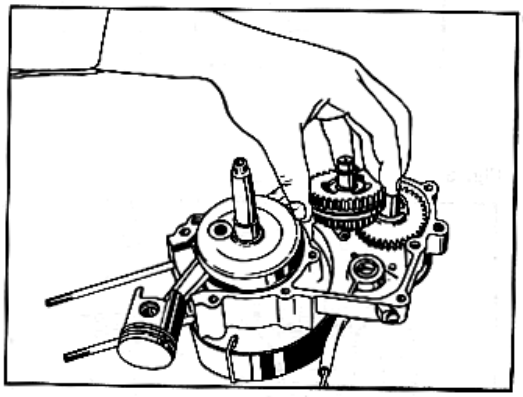


Fig. 15

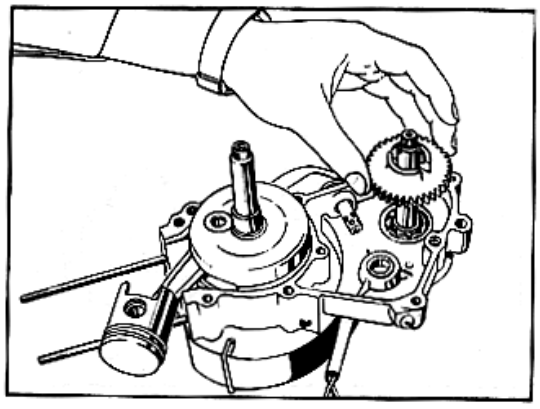


When removing and refitting the shoe carrier, take care not to damage or lose the distance piece and the sealing ring (19 x 15).

Separating crankcase halves

a) Unscrew and remove ten M6 x 45 screws from the left-hand crankcase half.
b) Fit the jig (crankcase halves separator) No.3T 210-10 000-14.5 on the studs and fasten it by two screws on the left-hand half of the crankcase.
c) Pull off the left-hand crankcase half (Fig. 13).

Fig. 16



Removing gears

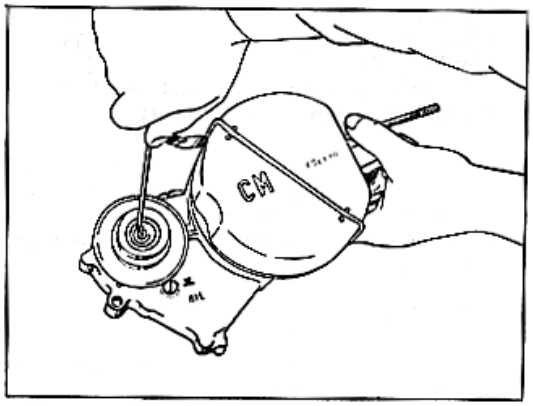
a) Removing driving gear (28 teeth) from output shaft —see Fig. 14.
b) Removing coaster pinion —see Fig. 15.
c) Removing driven gear —see Fig. 16.

Removing driver assembly

a) Using a screwdriver, loosen the circlip and pull the washer, the volute spring and the complete driver off the output shaft (Fig. 17)
b) Using circlip pliers, loosen the circlip and pull the washer, the cap, and the sprocket off the shaft (Fig. 18).
c) After loosening the circlip, press the output shaft out of the case.

When reassembling the output shaft, use the sealing ring installer (Fig. 19) to protect the shaft sealing rings from damage,

Fig. 17



Removing alternator

a) Use a screwdriver to loosen the alternator cover retaining spring, and remove the cover Then unscrew the M5 x 25 screw holding down the rotor.
b) Using the rotor drag No. 928-6000-1.1 pull of the rotor (Fig. 20) and the loosen the lock pin.
c) Remove two M4 x 22 screws fastening the stator, and pull the stator out of the crankcase right-hand half together with the leads.
After having removed the transmission clutch and the alternator, use a hand press to press the crankshaft out of the crankcase.

Engine re-assembly

To re-assemble the engine, reverse the procedure for its dismantling
a) Warm up the right-hand of the crankcase to about 70 to 80 °C and press in the crankshaft
b) Reassemble and reinstall the transmission,
c) Press on the left-hand half of the crankcase. (warmed up to about 70 to 80°C)

Fig. 18

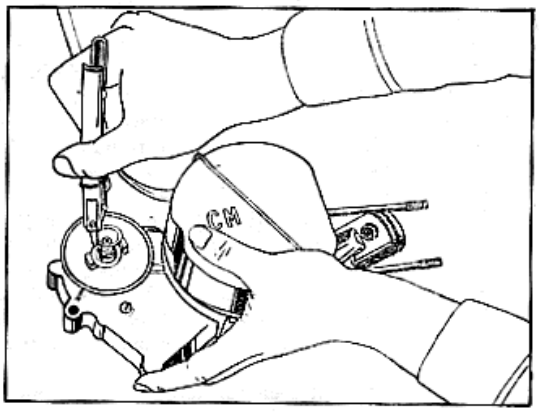


Fig. 19

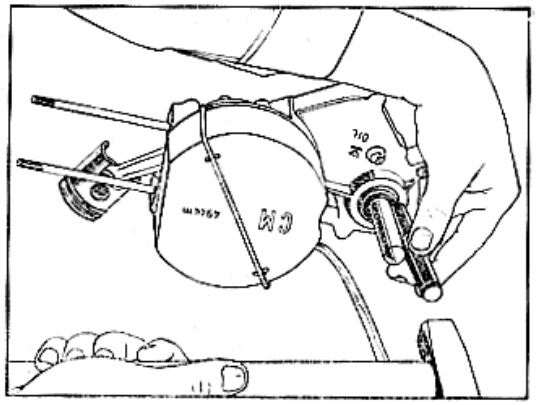
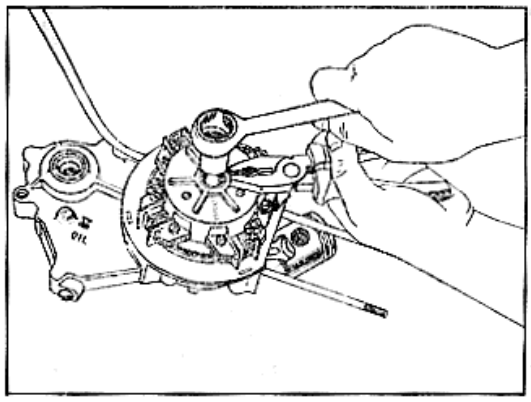


Fig. 20



d) Reassemble and reinstall the clutch.
e) Reinstall the reassembled alternator and the assembled driver (engine drive engaging and disengaging device)
f) Reinstall the piston, the cylinder, and the cylinder head.
(The arrow on the piston crown points down, towards the exhaust port.)

If any of the parts are worn beyond the acceptable measure, replace them with new ones.

Reassembling 2nd-speed clutch

Observe utmost cleanliness during the clutch re-assembly. Degrease the drum (large pulley) with a degreasing agent (e.g. alcohol, acetone, clean petrol, etc) and wipe it dry with a clean cloth. The roughness of the drum working (friction) surface must be at least 0.8, i.e. the surface must be polished with fine emery paper. A rougher surface has an unfavourable effect on the service life of the friction lining.

Make sure that the GUFERO sealing ring (15 x 24 x 7) in the drum is not damaged. Put the shoe carrier (base plate), with the two 2nd-speed shoes mounted in position together with the regulating driver located between them into the drum. All parts must be dry, without any traces of oil.

If oil has got between the joint faces during the dismantling, remove the 2nd-speed shoes and dip the carrier in a solvent (degreasing agent). Then dry the carrier thoroughly.

The hard chrome-plated lands of the regulating driver which touch the brass friction layer on the shoes must be bright, clean and dry. Rotate the shoe carrier together with the regulating driver anticlockwise and fit the parts in their position by a slight pressure of the hand.

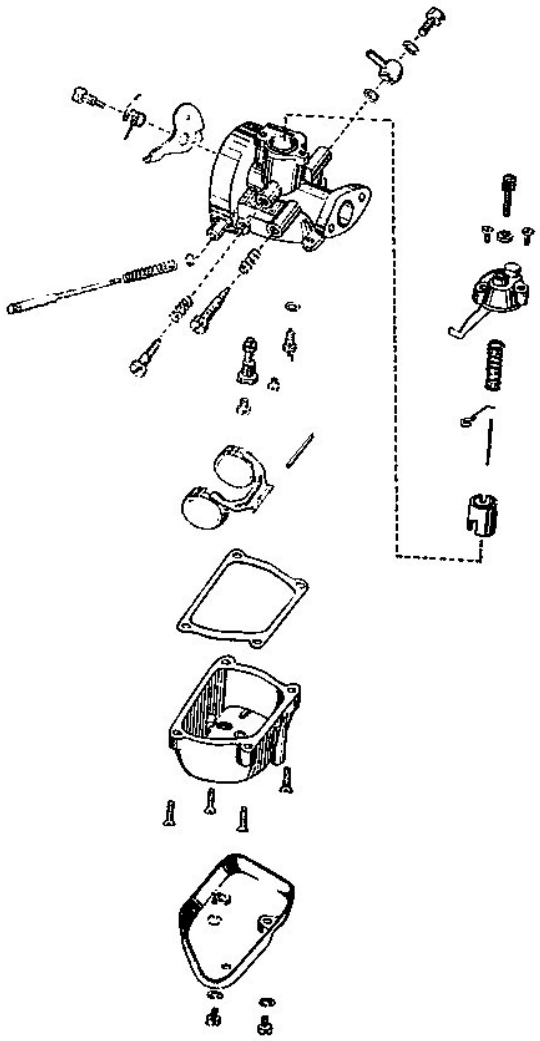


Fig. 21

Never touch the friction lining and the friction surface of the drum with greasy hands. Place the ,'O' sealing ring on the recess (clean and undamaged) of the carrier hub and locate the metal bush on the ,'O' ring. Then apply a tube of sufficient length and the same diameter as the bush on the bush, and by rotating and pressing down the tube, press the bush through the 'O' ring inside the hub. Then install the inside driver which ensures that the regulating driver controls both shoes at the same time. For this reason, the holes must be perfectly clean and the parts must have a certain clearance along the circumference with the exception of the contact areas.

Locate the circular sheet-metal washer and the clutch cover, and then screw down and tighten well the M10 x 1.25 nut

5. Carburettor (Fig. 21)

The moped is fitted with the JIKOV 2912 DC carburettor with the following parts and adjustments :

Main jet	**63**
Idling jet	**35**
Needle valve	
- needle position	**2nd notch from top**
Fast-idling screw	**540° (1 to 1½ turns)**

Routine maintenance of the carburettor includes its removal, flushing and swilling with clean petrol, and blowing through with compressed air. Clean the jets only with petrol (or acetone) and compressed air, never with lengths of wire or other hard objects which are apt to damage the calibrated holes.

To give the carburettor a thorough overhaul, proceed as follows:

1. Remove the carburettor from the engine, take it apart, and clean its parts thoroughly.
2. Discard worn parts and replace them with new ones.
3. Check the flatness of the flange and true it up if necessary on an abrasive cloth stretched on a flat board.
4. After trueing up the flange clean the carburettor body thoroughly once again.
5. Check the jets and adjustments for compliance with the recommended values.
6. Adjust the needle and the fast-idling screw as recommended and reassemble the carburettor.
7. Refit the carburettor on the engine. Start the engine, warm it up, and adjust the richness of the mixture by means of the air-correction screw. Then adjust the idling speed (from 1,600 to 1,800 r.p.m.) by means of the stop screw, and the needle valve and the free movement of the twistgrip by means of the throttle cable guide.

Checking and adjusting fuel level in float chamber

Check and adjust the fuel level after every renewal of the fuel float or if the fuel leaks from the carburettor and the leakage is not due to a defective float or needle. Fuel level adjusting procedure:-.

1. Rough (mechanical) adjustment -- see Fig. 22

With the carburettor removed from the engine, remove the float chamber cover. Turn the carburettor so that the floats are directed upwards, Check that the floats move freely on the spindle and that they are perpendicular to the carburettor centre line. Check also their height which must reach the level of the venturi tube top edge. If this is not the case, adjust the height of both floats by bending the arms. Floats adjusted in this way should maintain the fuel in the float chamber at the correct level.

2. Checking fuel level using the jig illustrated in Fig. 22a

After having adjusted, the fuel level mechanically it is recommended to check the adjustment with the help of the jig which you can make of plexiglass (Perspex) according to the drawing. Screw the jig on to the float chamber (bottom drain screw) and admit fuel into the carburettor. Its level should reach the centre index line with a tolerance of ± 1 mm. If this is not the case, adjust the floats by bending the arms upward or downward as necessary. The fuel level adjusted in this way complies with the manufacturer' s requirements. When checking the fuel level in the carburettor removed from the engine, it is necessary to observe the same height of the pressure column as exists between the fuel tank and the carburettor fitted on the engine.

Fig. 22

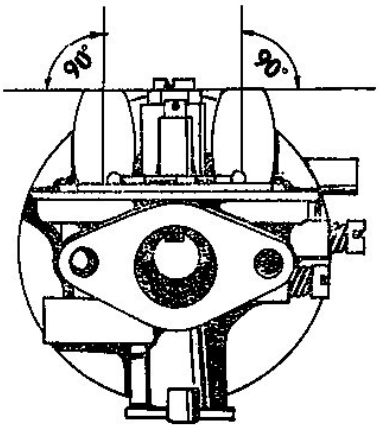
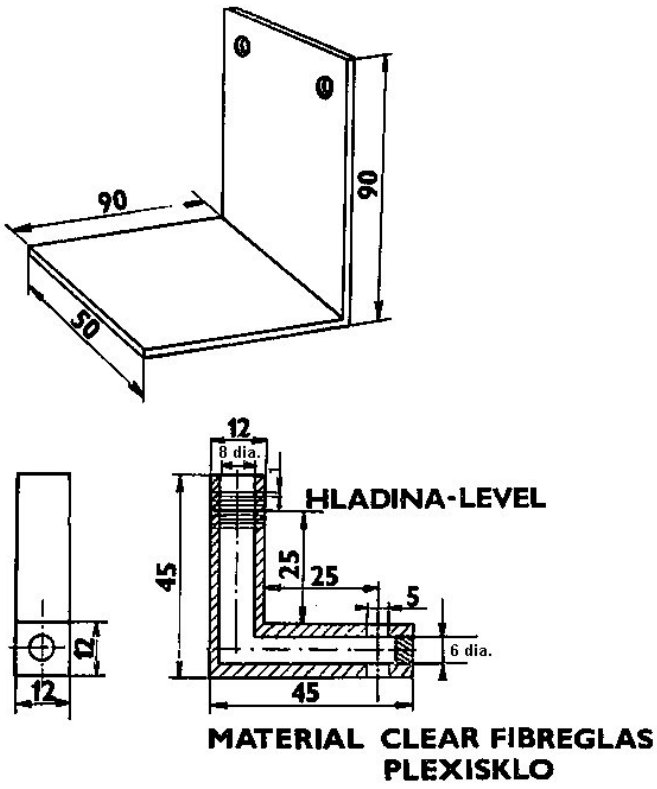


Fig. 22a



Classification Tables

Conrod small end	
Classification dia.17.984+0.016	
Class	Dimension
I	dia.17.984+0.004
II	dia.17.988+0.004
III	dia.17.992+0.004
IV	dia.17.996+0.004

Conrod small end	
Classification dia.18.003+0.010	
Class	Dimension
I	dia.18.003+0.003
II	dia.18.006+0.003
III	dia.18.009+0.003

Small end needles /rollers/	
Classification dia. 2-0.01	
Class	Dimension
1	dia.2.000-0.002
2	dia.1.998-0.002
3	dia.1.996-0.002
4	dia.1.994-0.002
5	dia.1.992-0.002

Piston - gudgeon pin hole		
Classification dia.14		- 0.004 - 0.012
X	dia.14	- 0.008 - 0.012
Y	dia.14	- 0.004 - 0.008

Gudgeon pin		
Classification dia.14.000-0.008		
1	dia.14.000	- 0.000 - 0.004
2	dia.14.000	- 0.004 - 0.008

Conrod big end	
Classification dia.26.2+0.02	
Class	Dimension
I	dia. 26.200+0.002
II	dia. 26.202+0.002
III	dia. 26.204+0.002
IV	dia. 26.206+0.002
VI	dia. 26.210+0.002
VII	dia. 26.212+0.002
VIII	dia. 26.214+0.002
IX	dia. 26.216+0.002