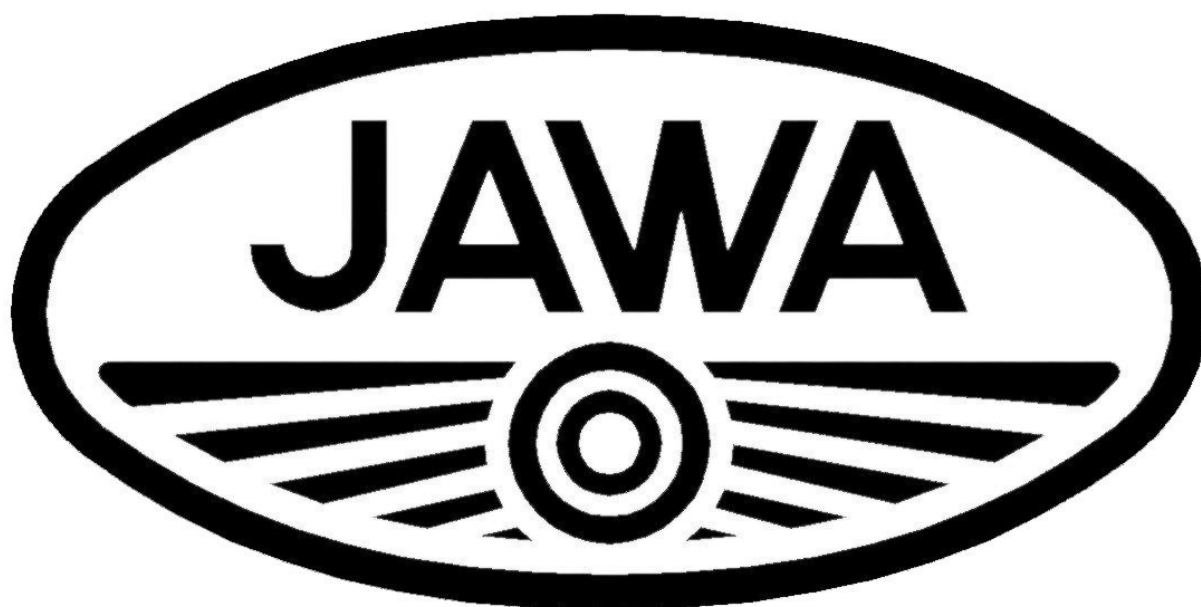


# **WORKSHOP MANUAL**



**JAWA 350/638,639,640**

ã JAWA Moto spol. s r.o. Týnec nad Sázavou  
2004



The purpose of this Manual, intended primary for specialized Jawa repair shops, is to facilitate all jobs connected with repairs of Jawa 350 motorcycles. All the described dismantling, refitting and adjusting procedures have been elaborated under the assumption, that the recommended tools and special jigs and fixtures will be used for them. All information, illustrations and technical data contained in this manual are based on the latest knowledge gained in and during manufacture. The Jawa Moto spol. s r.o. reserves the right to change its products any time without a previous notice. Any changes and or deviations from the standard version for certain territories will be published in the form of Supplements to this Manual. It is not permitted to reproduce this Workshop manual or its parts in any form whatsoever without written consent.





## PRE-SALE SERVICE

1. Unpack the motorcycle, free it from preservation grease, assemble the separately delivered units and parts of accessories /control of completeness/.
2. Check engine and frame numbers – to be conform with the documentation.
3. Take out the accumulator – charging – forming, assembly.
4. Control the oil level in the gearbox – refilling.
5. Control all the functions of electrical accessories.
6. Basic adjustment of the headlight /page 50 operating instructions/ and verification of headlight tilting.
7. Check ignition – spacing between catcher and rotor.
8. Adjustment of coupling.
9. Adjustment of brakes. /idle run, deaerate front, clearance of stop switch cable/
10. Filling the machine with min. 1 liter of petrol – lubricated 1:50 and starting the engine. (Motos without Oil-master) By motorcycles with Oil-master – filling in oil, deaerate whole systém, filling in petrol and starting.
11. Adjusting the idle run on warm engine, retightening of cylinderheads and exhaust elbows.
12. Control of bolted connections.
13. Instructions about attendance of machine and handing over to the customer.

## TECHNICAL DATA

## DIMENSIONS OF MOTORCYCLE

Length	2100 +/- 30 mm
Width	780 +/- 15 mm
Height	1160 +/- 30 mm
Clearance	120 +/- 10 mm
Seat height	820 +/- 15mm
Axle base	1370 +/- 25 mm
Min. turn radius	3,5 +/- 0,4 m

## MASS AND LOAD

Proper mass	149 +/- 3 kg
Running mass	162 +/- 3 kg
Overall mass	342 +/- 3 kg
Payload	180 kg
Nr. of seats	2
Trailer mass	50 kg overall
Sidecar mass	172 kg overall

## ENGINE

Category	two-stroke, air-cooled
Nr. of cylinders	2
Cylinder capacity	343,5 ccm
Bore	58 mm
Stroke	65 mm
Compression ratio	9,8 + 0,7 : 1 - 0,3 : 1
Max revs.	5750 / 1 min
Max output	17 kW–10% -5250/1 min +/- 3%
Max torque	32 Nm–6% - 4750/1 min +/- 5%
Class	Jikov 28-29 CE horizontal

## CARBURETOR

Slide type

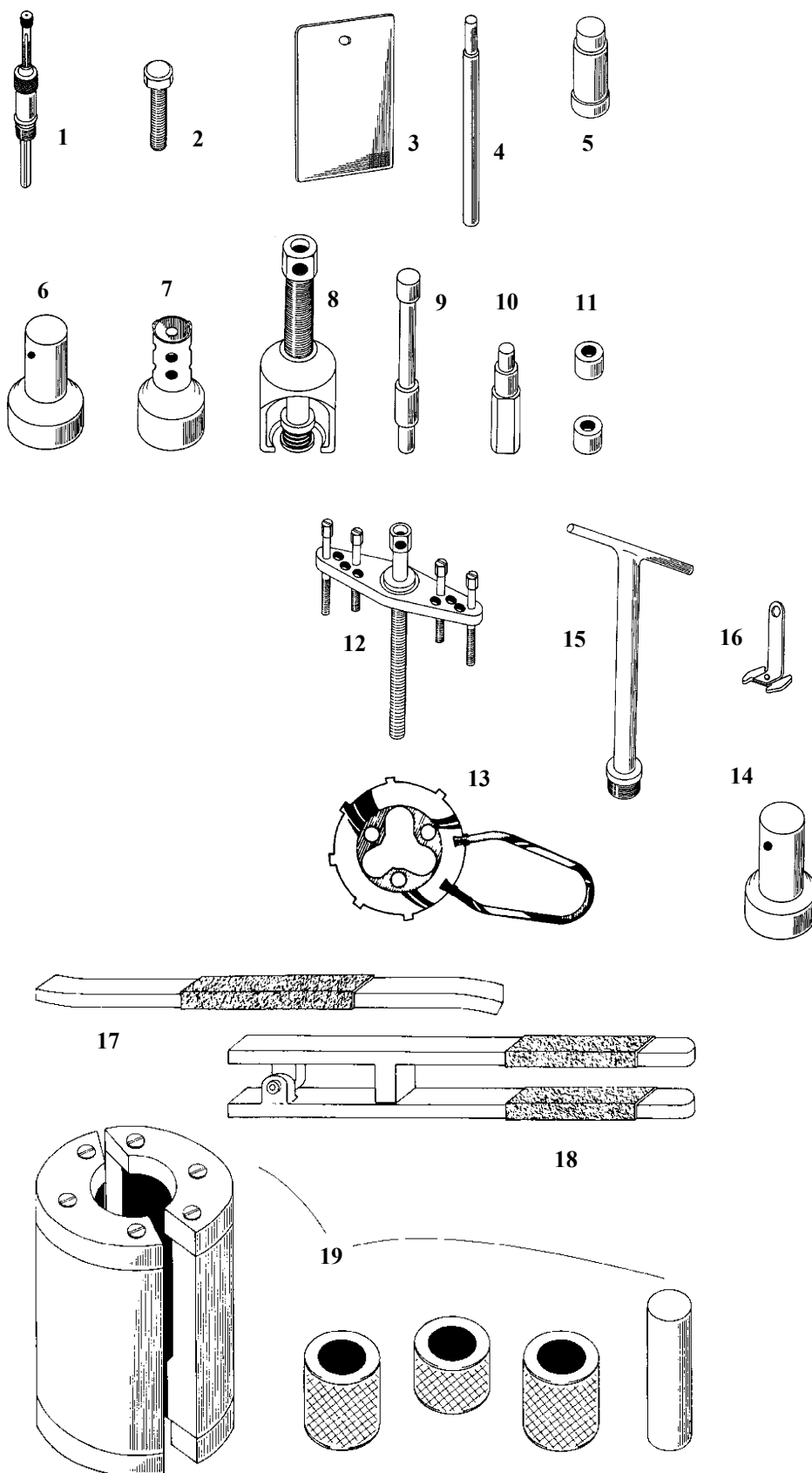
## CLUTCH

Type multiple-disc in oil bath



GEARBOX	Type	mechanical with gears, double shaft
	Number of gears	4
	Control	by foot lever
	Overall ratio	climbing capacity with full load
	1.st gear	1 : 14,50 41%
	2.nd gear	1 : 8,60 20%
	3.rd gear	1 : 6,10 14%
	4.th gear	1 : 4,96 9,5 %
	primary chain	2 x 9,525 x 4,77 66 links
	secondary chain	1 x 12,7 x 7,75 126 links +1 conect
SUSPENSION	Front	telescopic fork, steel spiral springs
	Stroke	150 mm – wheel axle 134 mm
	Rear	swing arm, spiral springs
	Stroke	80 mm – wheel axle 90 mm
	Front shock absorber	hydraulic
	Type	telescopic in fork's arms
	Rear shock absorber	hydraulic
	Type	telescopic in suspension units
RIMS	Front wheel	steel, deepened profile
	Dimensions	2,15 B x 18"
	Rear wheel	steel, deepened profile
	Dimensions	2,15 B x 18"
BRAKES	Front	disc type, hydraulic control
	Dimensions	ø 265 mm
	Rear	drum, mechanic control
	Dimensions	ø 165 mm
ELECTRIC OUTFIT	Ignition	magneto VAPE A67 contactless
	Output	12 V, 180 W
	Battery	lead type, 12 V, 6 Ah
	Headlamp	asymmetrical, rectangular, adjustable 12 V – 60/55 W 12 V – 4 W BA 9s
	Dip switch	sliding type
	Indicators switch	lever type
	Tail lamp	group type
	Indicators location	headlamp bracket rear frame
FUEL AND LUBRICANTS	Fuel tank capacity	17 l, 2,8 l reserve
	Gearbox – oil charge	1+0,1 l
	Suspension – oil charge	
	Front	200 ccm per arm
	Rear	47 ccm per absorber permanent charge
	Front brake	brake fluid DOT 4 to max. (upper edge of window)
	Type	tubular, double, closed
FRAME		

# LIST OF REPAIR TOOLS FOR TYPE 638, 639, 640





### LIST OF REPAIR TOOLS FOR TYPE 638, 639, 640

ITEM NR.	TYPE DESIG.	SERIAL NR.	QUANTITY	DESCRIPTION
1	S-46	9.71.51559.4	1	Feeler gauge for ignition advance adjustment
2	S-97	9.71.880097	1	Drag (for rotor)
3	S-63	9.71.51589.4	1	Pawl retainer
4	S-64	9.71.515590.4	1	Drift, centering bushes
5	S-71	9.71.51577.4	1	Drift for driving out bearings
6	S-72	9.71.51576.4	1	Drift for driving home sealing rings
7	S-81	16-19758-4	1	Tubular spanner – steering head
8	S-85	9.71.52248.4	1	Drag, removing primary sprocket
9	S-86	9.71.52253.4	1	Drift die
10	S-87	9.71.52252.4	1	Mandrel for gudgeon pin pressing die. 16 in and out
11	S-88	9.71.52251.4	1	Auxiliary bush, connecting rod small end
12	S-90	28-86-763	1	Jig with bolts for separating crankcase halves
13	S-66	9.71.51603.3	1	Auxiliary clutch plate
14	S-92	28-86-765	1	Drift
15	S-93	28-86-766	1	Fork leg extractor
16	S-94	28-86-814	1	Primary chain adapter
17	S-201	9.96.55407.3	1	Lever
18	S-203	28-86-767	1	Pliers
19	S-205	28-86-725-2	1	Pressing jig with accessories

### List of lubricants recommended for motorcycle JAWA 350

	Use of oil	type of oil in the Czech rep.	Viscosity Class	notes
A	gearbox temperature over 0°C brake lever pins clutch lever pins brake cams stand pins bowden cables	Mogul Trans 90  Gyrol 90  Mogul Trans 80W/90  Byrol 80W/90	API GL 4  SAE 90  API GL 4  SAE 80W/90	    whole year
B	engine lubrication			
B1	lubricated petrol	Mixture ratio 1:60 – after running in, 1:50 during running in For whole year riding use oil of viscosity class SAE 30-40 for two stroke engines and with classification according to API TS.		
B2	Lubrication with Oil-master system For whole year riding use prediluted or syntetic oil for two stroke engines according to recommendation of individual oil producers. For riding in temperatures over 0°C can be used oil for two strokes engines of viscosity class SAE 30-40 and with classification according to API-TC.			



C	Telescopic front fork	Mogul Super 15W/40 Mogul Super stabil 15W/40	API SD/CB or API SF/CC SAE 15W/40
D	accelerator twist grip Swinging rear arm	energrease LA2 energrease LA2	ISO-L-XBCEB 2 ISO-L-XBCEB 2
E	rear sprocket bearings	energrease LA2	ISO-L-XBCEB 2
F	wheel bearings	energrease LA2	ISO-L-XBCEB 2
G	secondary chain	special spray e.g. Castrolû Mo S2, Gleitmo 582 .....	

OPERATING LIQUIDS                      TYPE OF LIQUID IN CZ                      CLASSIFICATION

A	brake fluid	Syntol HD 260	DOT 4
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**Maintenance plan**

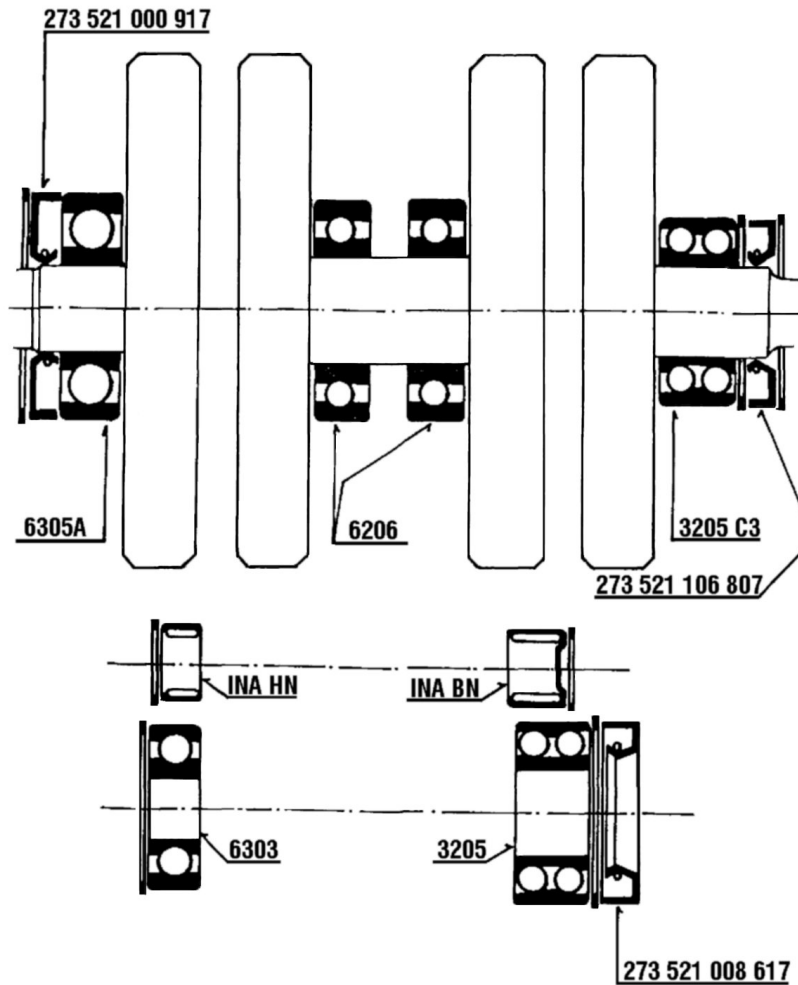
km		500	1500	2500	5000	10000	15000	20000	25000	30000
Transmission oil	*	V		V	K	V	K	V	K	V
Clutch	*	K	K	K	K	K	K	K	V	K
Carburettor				S						
Air filter	***			K	K	K	V	K	K	V
Steering head			K			K	M	K		K
Rear suspension						V		K		
Secondary chain		K	K	K	M	K	V	M	K	V
Wheels and rear suspension bearings						M		M		M
Brakes – brake lining						K		K		K
Bowden cables	****				K	K	K	K	K	K
Battery		K	K	K	K	K	K	K	K	V
Alternator						K		K		
Ignition spacing - between rotor and catcher		S	K	K	K	S	K	S	K	S
Spark plugs					C		V			V
Front fork – oil exchange	****	V			V	V	V	V	V	V
Wheels – spokes stretching				K						
Brake lever pins, joints, stop switches, accelerator twist grip	*		K	K	K	K	K	K	K	K
Piston, piston rings, transfer ports						K		K		
Brake plate				K	K	K	V	K	K	V
Screws, nuts and packings	***	K	K	K	K	K	K	K	K	K

*	check as often as necessary	K	checking, cleaning, adjusting or eventually replacement
**	check every 1000 km	C	cleaning
***	check every 2500 km	S	adjustment
****	check every 5000 km	M	lubrication
V	replacement	D	decarbonization

After running of:

25 000 km	primary chain replacement
30 000 km	check or exchange of connecting rod bearings, steering head bearings, shaft type gasket rings with the crankshaft as well as wheel with hub, wear of cylinder (event. re-bore)
50 000 km	complete dismantling of brake system

### List of main bearings and sealing rings

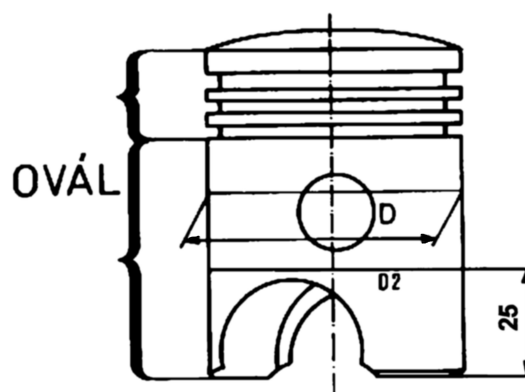


Designation	name of part	pcs.	positin
324 594 043 400	needle bearing INA HN (15x22x12)	1	engine – left side
324 163 030 100	bearing 6303 A	1	engine – left side
324 163 059 566	bearing 6305 A	1	engine – left side
324 594 049 200	needle bearing INA BN (16x22x12)	1	engine – right side
324 232 050 000	bearing 3205	1	engine – right side
324 232 050 003	bearing 3205 C 3	1	engine – right side
324 162 069 566	bearing 6206	2	ckrankshaft
273 521 008 617	sealing ring (30x52x10)	1	engine – right side
273 521 106 807	sealing ring (25x52x7)	1	engine – right side
273 521 006 917	sealing ring (25x62x8)	1	engine – left side
273 521 100 417	sealing ring (8x16x7)	1	speedometer drive
324 914 010 452	ball (Ø 6,35)	1+36	frame head, clutch release
324 163 020 100	bearing 6302 A	2+2	front and rear wheel
324 162 050 100	bearing 6205 A	1	rear wheel sprocket



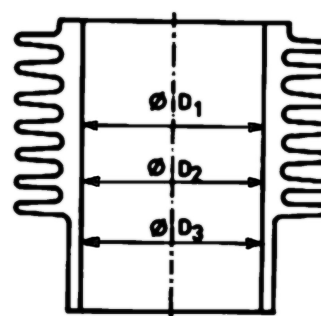
### Piston grading

	Grading	D 2 + 0,000 - 0,010
Standard	A	57,972
	B	57,982
	C	57,992
1. re-bore	A	58,222
	B	58,232
	C	58,242
2. re-bore	A	58,472
	B	58,482
	C	58,492
3. re-bore	A	58,722
	B	58,732
	C	58,742
4. re-bore	A	58,972
	B	58,982
	C	58,992



### Cylinder grading

**Note:** The manufacturer delivers spare cylinders exclusively with the basic /standardú bore. The other dimensions given in the table are guides for cylinder reboring. As it is very difficult to rebores the cylinders accurately within the tolerance limits of hundredths of millimeters, it is necessary to check the bore of the rebored cylinder by measuring it at several points, and to use a piston of grading corresponding to the measured dimension. The grading mark on the top face of the cylinder has to be changed accordingly. In the engines (new or rebored) the right-hand and left-hand may be of a different grading class (but not of different rebore grading). In the case of cylinders with rebore in between of two grading groups, it is possible to use a piston of B or C group. With the B piston is running in quicker, with C piston knocking is likely on cold engine (after start).



Grading	D1	Standard D2	D3	I.re-bore	II.re-bore	III.re-bore	IV.re-bore
A	58,01+0,01	58,01+0,01	58,01+0,02				
B	58,02+0,01	58,02+0,01	58,02+0,02	+0,25	+0,5	+0,75	+1,00
C	58,03+0,01	58,03+0,01	58,03+0,02				
D	58,04+0,01	58,04+0,01	58,04+0,02				

### List of gudgeon-pin bearings

Connecting rod	Gudgeon pin	Needle roller Ø 2 x 13,8	Clearance
Red 19,994+19,998	Blue 15,994+15,997	1,994+1,996 1,993+1,995	0,005+0,016 0,007+0,018
Blue 19,998+20,002	Red 15,997+16,000	1,994+1,996 1,993+1,995	0,006+0,017 0,008+0,019
	Blue 15,994+15,997	1,996+1,998 1,995+1,997	0,005+0,016 0,007+0,018
White 20,002+20,006	Blue 15,997+16,000	1,996+1,998 1,995+1,997	0,006+0,017 0,008+0,019
	Blue 15,994+15,997	1,998+2,000 1,997+1,999	0,005+0,016 0,007+0,018
Yellow 20,006+20,010	Red 15,997+16,000	1,998+2,000 1,997+1,999	0,006+0,017 0,008+0,019

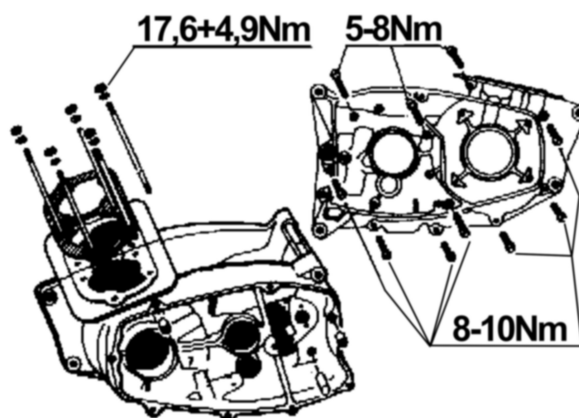
## I. ENGINE

### 1.1. Disassembly and Assembly of the Cylinder Head and Cylinder

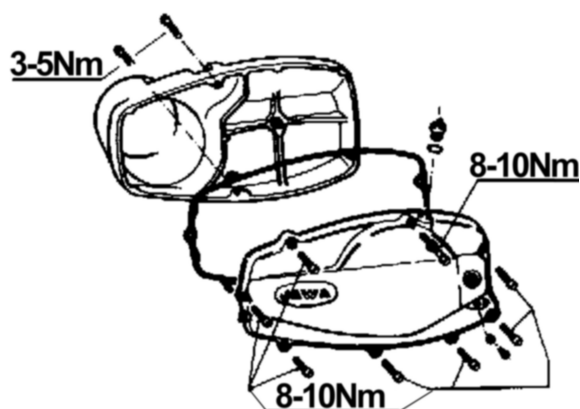
Prior to disassembly take out the carburettor flange, which is shared by both cylinders.

Using the box spanner loosen and remove the eight M10 nuts to be able to loosen and remove the cylinder heads. Rotate the engine until the piston of cylinder which should be removed is in the bottom dead center. Take out the cylinder and cover the ensuing holes to avoid drain of dirt. For assembly proceed in opposite sequence. Clean the cylinder and engine housing seating surfaces before assembly. Oil the cleaned cylinder working surface and put it on the piston. During the assembly proceed with caution, check if piston rings sit right in the joints to protect them from damage.

Fit new sealing under cylinderheads (in case the old is damaged). Screw the head bolts nuts home crosswise



using the torque spanner at the force of 17,6 Nm. If the engine is mounted in the frame, first remove seat and tank, separate the exhaust elbows and disconnect the coils, cables and cable shoes.



## 1.2. Pistons – demounting and mounting

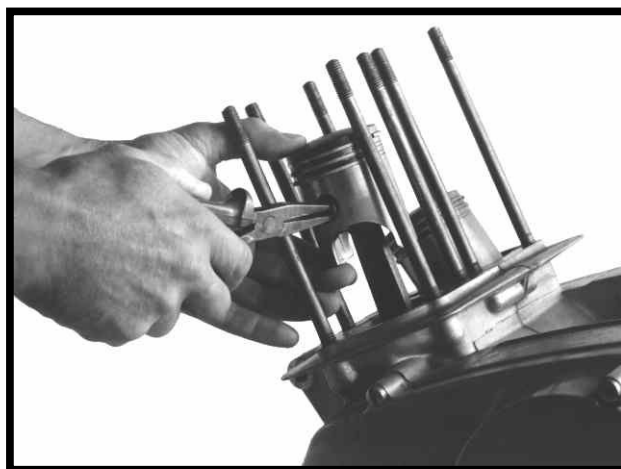
Since the piston is mounted in the cageless needle bearing, use special tools for demounting the piston.

There is a danger that some needles may fall into the engine internals. This may result into heavy damage of engine and would be necessary to dismantle the engine and find strayed needles. The following procedure is recommended:

Take off the cylinders ( see sect. 1.1), plug the crankcase holes, remove piston rings and using suitable plies remove piston pin locks.

Fit the auxiliary insert S-88 into the piston opening and the press-out pin in the auxiliary insert. Push the pin as far as the pin support surface. Detach the piston from the piston rod top end and lock the auxiliary insert S-88 (held between the needles in the piston rod end). And the two original take-up rings to avoid their falling down.

Prior to proceeding to mounting the pistons, make sure that all needle rollers (28 units per rod) and the take-up rings are fitted in the connecting rod top ends. The auxiliary inserts S-88 must be mounted inside the rollers. When fitting a piston on the connecting rod top end, make sure that take-up rings and rollers do not fall into the engine housing internals

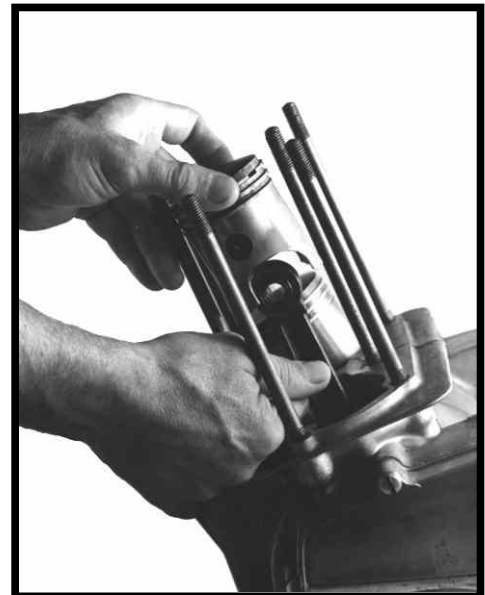


Piston must have signing L (left side) or P (right side) for the corresponding cylinder and the arrow must be oriented forward to the exhaust ports. Use the press-out pin S-87 to push the piston pins. Make sure, that the lightening holes of the piston pins are oriented to the engine outside. Lock the piston pins with lock rings. When mounting new pistons, check if their identification marks (i.e. A,B,C) correspond to each cylinder.



Make this check before mounting the piston rings to be sure that the piston in the cylinder is not off the axis: fit the piston (without rings) provisionally on the piston and turn the crank mechanism with the starting lever to see if the piston have the identical clearance on each side when it is in the top dead end position.

If it leans permanently against one side and, when pushed off, returns to the original position, take the cylinder out and bend with caution the connecting rod with piston to the other side. This act is called „connecting rod angle adjusting“. The truly adjusted connecting rod must have the identical play on each side.



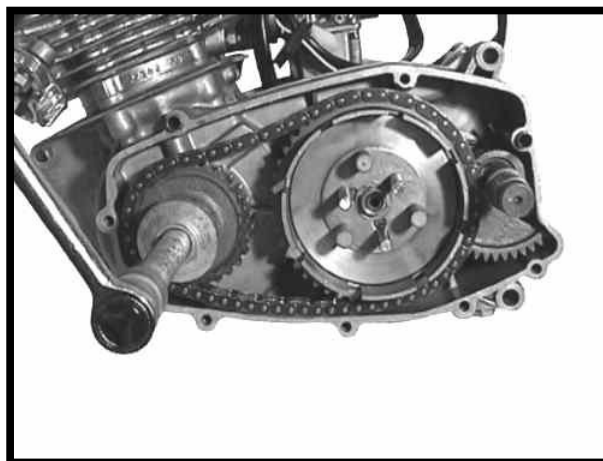
### 1.3. Primary gear, clutch - dissassembly

**CAUTION:** First drain oil from the gearbox. Take off the starting lever (first move it to the star position) and remove the bolts holding the left engine cover. After compressing the springs take off the clutch pins, dismantle the washers and springs and plates and insert the securing plate S-66 into the clutch drum.

With barrel spanner nr.19 remove the nut M12 and take off the inner clutch drum.

With barrel spanner nr. 27 loosen the primary gear nut. Using S-85 puller remove this primary gear and take it together with the clutch cage and chain off the shafts.

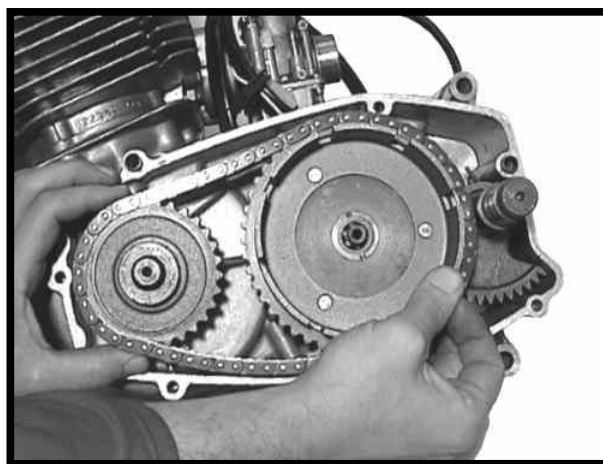
In most of the cases you may remove the clutch cage without having to strip the primary chain wheel, while moving a few times the clutch cage on the mainshaft and releasing thus the clutch gear spacer. Grip the released spacer and pull it out and remove the cage.



#### 1.3.1. Assembly

Fit the primary chain gear on the clean, dry crankshaft taper and the washer and spacer (test the run out rate of the spacer faces before the assembly) on the mainshaft. Place a steel ruler on the gear flank against the gears to make sure that both gears are alligned (admissible tolerance is of 0,5 mm).

The true alignment is important for primary chain lifetime expectancy and the primary gear noise rate. To eliminate the deviations (if any) of the clutch chain gear fit steel shimp of adequate thickness on the mainshaft between the bearing and the washer. Test the parallelity and take off the clutch gear again. Before mounting the starting gear check the condition of the shaft seal ring. Mount the starting gear (move the shaft for the purpose to be in the starting position). Fit the primary chain on the chain gear crankshaft taper and crankshaft. Put on the inner clutch drum (with fitted undamaged lock washer) on the mainshaft. Fix the carrier with nut and lock the washer. Screw home the primary chain gear nut on the crankshaft For the job use the S-66 jig.

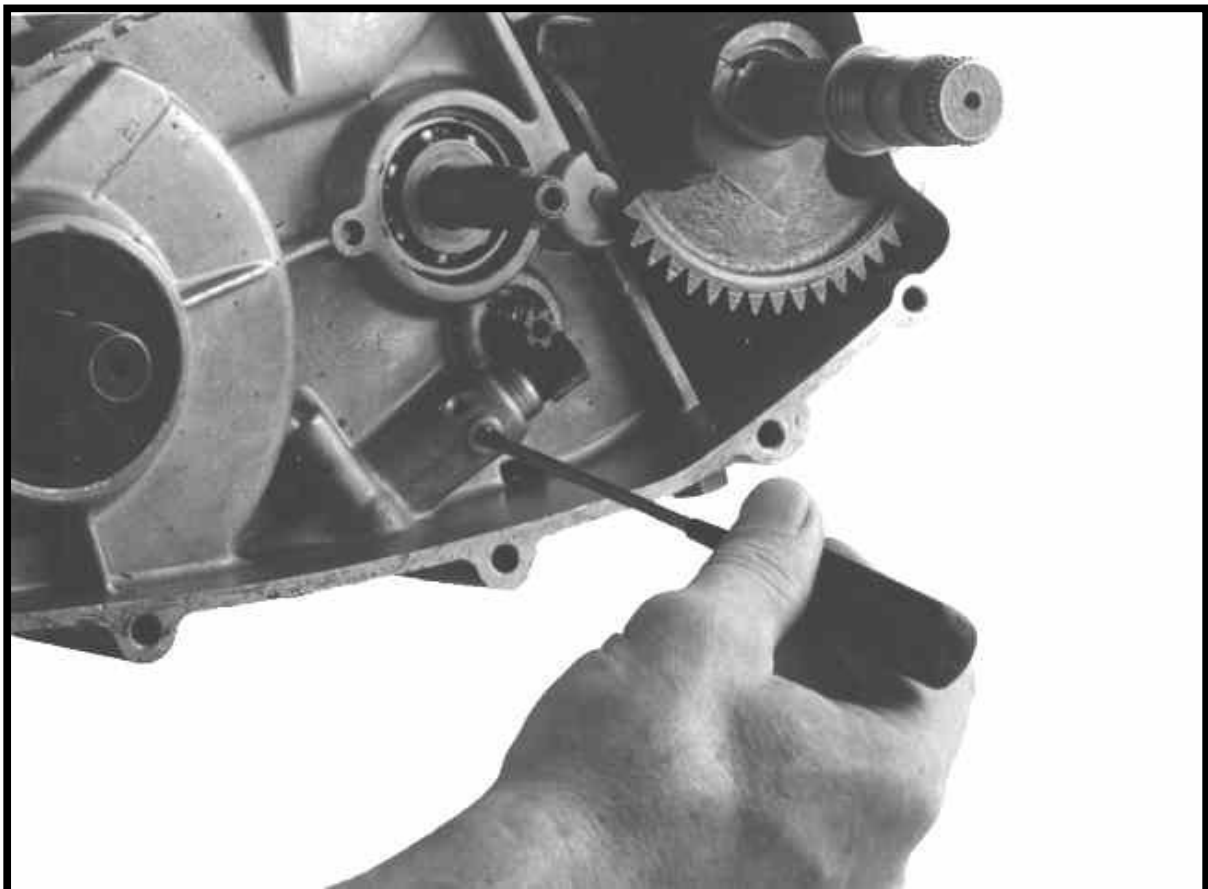


#### 1.4. Clutch - assembly

Fit the oiled clutch rod with rest in the mainshaft. On the outer drum put one by one the friction and steel discs. If we change the plates, before the assembly, measure their overall thickness, wich should be 18,25 +/- 19 mm (5 plates). Put on pressure plate with springs and washers over them. Compress successively the spring over washes with spanner nr. 10 and over the washers fix the securing pins. The tightening torque of the M12x1,25 nut holding the clutch is 35-40 Nm.

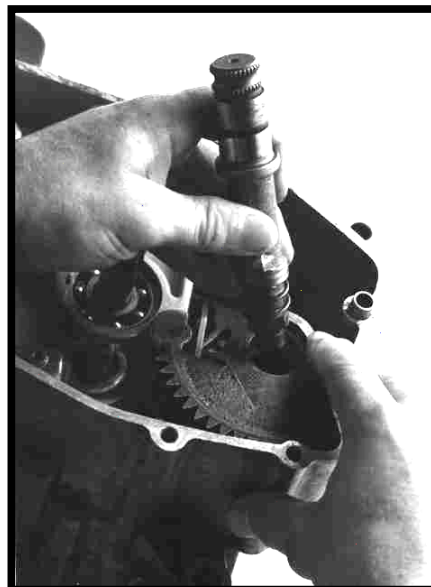
#### 1.5 Speedometer drive and sealing

Dismount the primary gear as described under 1.3. Unscrew the M6 bolt provided on the engine bottom and holding the speedometer drive socket and take it out of the engine. Unscrew the grub screw from the lug provided on engine housing inner bottom (the screw drives the speedometer). Using a stick (preferably an aluminium one) knock the drive casing and the seal ring into the housing space. For mounting, fit the new 8x16x7 seal ring on the drive shaft (spring should face the engine internals), and using a suitable pipe or socket wrench of 15 mm outer diameter tap on the drive to push it through the housing to its seat as far as the point when groove on the drive surface is in the line with the thread for the lock screw in the housing. Once a screw is screwed home, drift it with centre punch



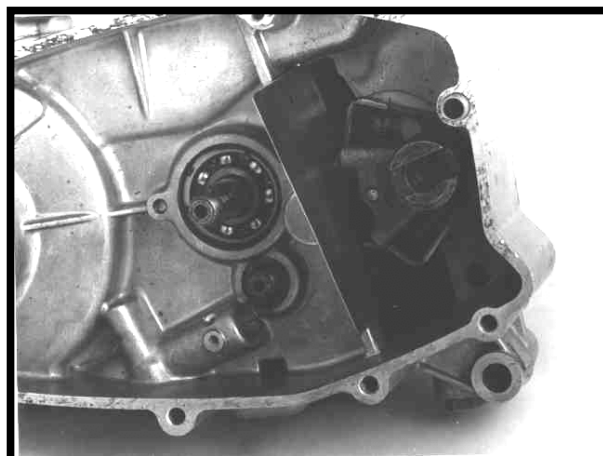
### 1.6. Starter spring (primary gear dismounted)

Turn the starter shaft to the left and take it out of its mounting. Take off the starter segment and spring. When remounting the spring, fit its one end on the segment edge. Turn the segment to get it in its true position, with the segment hole centre aligned with the carrier hole center. The other end of the spring sits on the engine housing rear wall. Fit in the starter shaft (with spring) and turn it to get it in the starting position.



### 1.7. Shaft with carrier Gearshift pawl (primary gear dismounted)

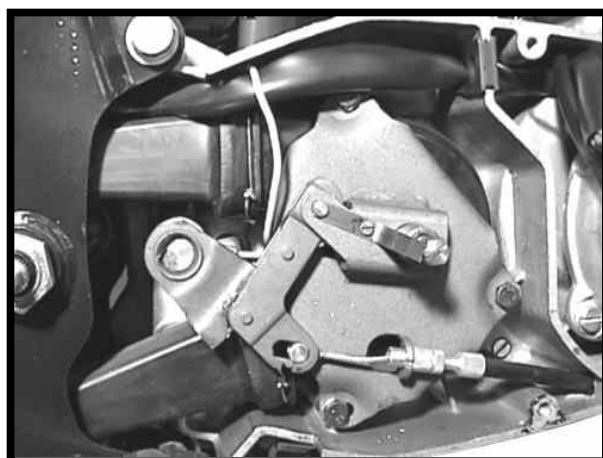
Turn the starter shaft and take it off along with the starter segment and return spring. Drive out the pin which holds the clutch-disengagement cam on the shaft (from the bottom to up) and remove the cam. Fit the pawl holder S-63 between the gate and the pawls and pull with caution the shifter shaft with carrier and pawls out of the mounting. When remounting the set, support the S-63 holder against the carrier pawl and fit the oiled shaft in its mounting. See that the carrier pin sits truly between the return springs in the gate. Mount semi-automatic set of the clutch on the engine right hand flank. Then proceed as described under .



### 1.8. Dismounting the semi-automatic clutch disengagement set. Adjusting

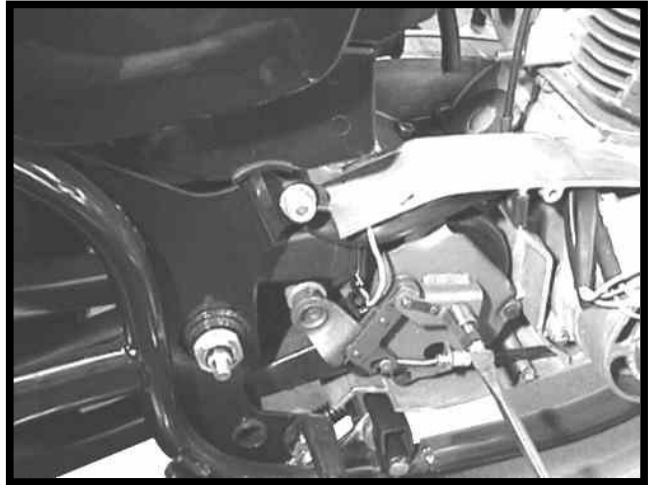
Loosen the nut and remove the brake pedal. Remove the engine cover. Using the spanner 10 unbolt three bolts and remove the holder. Also unhook the clutch bowden. For remounting proceed in reverse sequence.

Note: After remounting the semi-automatic clutch disengagement set, you have to adjust it – see chap. 1.



### 1.9. Adjusting of semi-automatic clutch disengagement set

- Remove the right engine cover
- Screw home the clutch cable adjusting bolts on bowden (make bowden shorter) to loosen the cable socket on clutch control set.
- Adjust the play between the foot clutch disengagement cam and the disengagement roller with the clutch disengagement bolt M8 to make them touch. (the play between set bolt and control pole is 0,1 – 0,3 mm)
- Eliminate the play on the clutch lever on handlebar by adjusting bowden bolts.



### 1.10. Rear wheel sprocket Removing and refitting

Remove the semi-auto clutch release device. Loosen the clips of the rubber chain guards and lift off the outer cover of the secondary sprocket. Unlock the lock washer under the nut. With the slack secondary chain, pull the secondary sprocket with the chain and inner cover out of its bearings. It is not necessary to disconnect the chain. Reverse this procedure to refit it back.

Note:

Be carefull when refitting the secondary sprocket. It must slide easily on the splines. Do not drive the sprocket forcefully into the bearing (inside the crankcase) in spite of its being secured against normal stressing with a buttress plate. There is danger of serious damage to the gear shaft forks and gears of gearbox.



### 1.11. Take out the engine from the frame

Take off the saddle, disconnect the battery fuse and take off the spark plugs caps. Detach the fuel supply hose remove the fuel tank, unscrew the carburettor cap and take off the bowden with the slide. Remove the M8 nut holding the exhaust bent flanges and turn the bents to the side, so they would not be in the way. Detach the tachometer drive provided below the engine and the speedometer. Remove the right engine cover, detach the alternator cables. Dismount rotor using jig S-97. After screwing off four bolts M6 remove alternator stator. Detach the cable from the idling gear contact and pull the whole cable bundle out of holder in the engine case. Detach the bowden cable from the clutch automatic set, unscrew the three bolts and remove the control set of clutch. Loosen the rear wheel axis and the transmission gear nut. Loosen the chain tensioner and move the wheel forward to remove the chain.



Take off the outer cover sprocket, loosen the gear nut and unscrew with nr.32 socket spanner. Pull out the sprocket with inner cover from mounting.

**It is not necessary to uncouple the chain.**

Remove the right footrest, bolts and pins holding engine into the frame. Standing on the right side grip the engine with right hand by the cylinder and with left hand by the start lever (see pic.) Lift the engine slightly to the front, shift it to the right and take it out of the frame. Avoid damaging the paint – protect frame pipes (e.g. by rubber tubes).



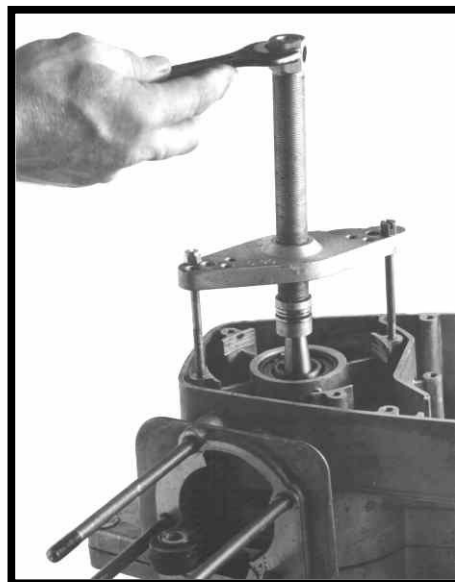
## II. DISMOUNTING AND MOUNTING THE ENGINE HOUSING

### 2.1. Basic disassembly

Clamp the engine front section between vice jaws in such a way, that the engine left side is accesible. Remove the carburettor, primary gear, cylinder heads and pistons. Drive the rear centring element from the left side of engine housing to the right side. Take out the clutch automatic release device and remove M6 bolts holding two halves of engine housing together. Take the housing out of the vice and lay it down on the left side.

### 2.2. Separating two halves of engine

Bolt the S-90 puller in the M6 thread holes in the housing (see pic). and strip with it uniformly the right half of the housing from the crank mechanism bearing. Take care to keep the right connecting rod in the top dead end position, it has to pass easily through the central housing slit. If during the stripping the right half of housing gets jammed, knock with caution on the rear poart of housing event. turn a bit shaft of sprocket to keep stripping procces uniform. After two halves are separated enough remove the mid insert between two cylinders – to allow free passage of connecting rod. Finish separating and remove the right half.



**Suggestion:** Use grease (f.ex. PM-NH2, LITOL 24, CASTROLEASE LH-2 ...) to avoid needles falling out of countershaft bearings.

### 2.3. Gearbox – shifting, crank mechanism

With the engine in this dismantled condition, it is possible to repair the gearbox and the gear shift mechanism. Without pressing the crankshaft mechanism out of the other crankcase half. During the inspection of gearbox and gearshifting, remove the shifter fork rod, the shifter forks, the layshaft and the gears. With soft mallet tap the mainshaft out of bearing. If it is necessary to remove the gear shift plate, remove the four, dot secured countersink screws from the gate, turn the gate to suitable position and remove it from case. To remove the crankshaft screw the S-85 drag with two M8 screws into the threaded holes for fastening screws of left half crankcase cover. Push out the crankshaft out of left half of case.

**Remember:** connecting rod must be in its top (T.D.C.)

### 2.4. Exchange of layshaft needle bearings

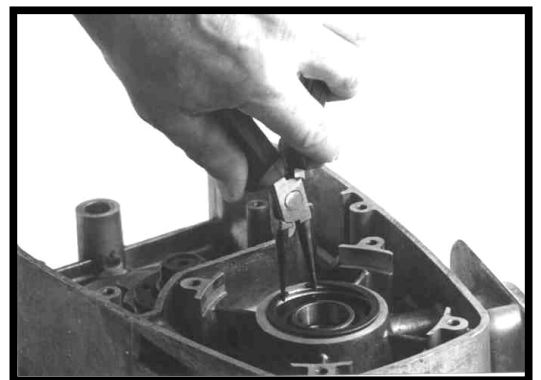
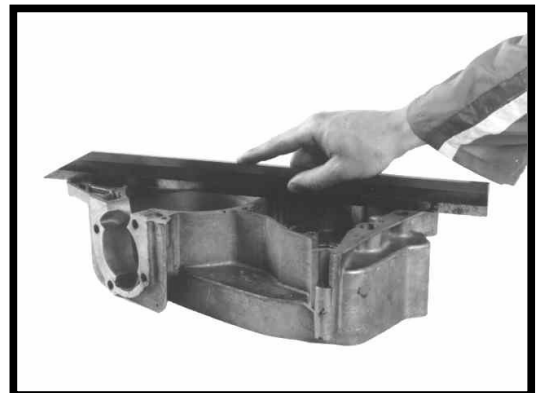
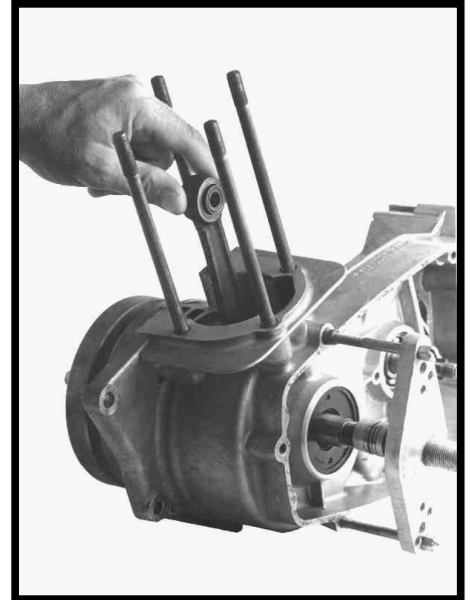
After removing locks drive the bearing into the crankcase with a drift. To facilitate this job, remove the speedometer drive from left half of engine. Put new bearings into the crankcase – heat case to 80-120°C. After pressing them home, fill them up with grease to avoid loosening of needles.

### 2.5. Testing the evenness of seating surfaces

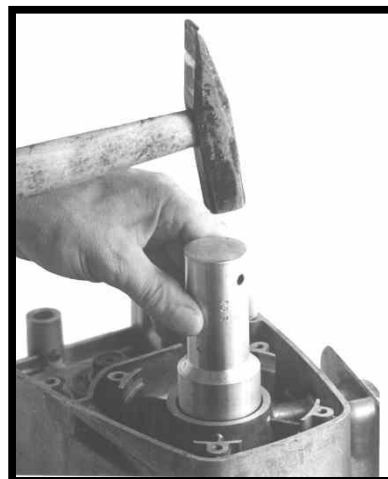
Clean thoroughly the seating surfaces and test the evenness of the whole engine housing with the steel ruler. Grind the surfaces plain on a plate if necessary. Clean the ground surfaces thoroughly of the grinding paste.

### 2.6. Exchange of bearings and seal rings of crankshaft mechanism

Change bearings in case they are noisy or worn out. Dismantle the engine housing, remove the lock rings of sealing rings. Heat the case up to 100-120°C and using the drift S-71 drift the bearing into the engine case. Use drift S-72 to drift out the sealing ring (from inside-out). Mainshaft bearing drive out similar way.



Also after unlocking and driving wheel inside the case. Mounting of all bearing is realised to heated case (100-120°C). Put the bearings into the pre-heated halves of engine case, getting them inline with the machined surface intended for the crank mechanism flywheel. Push the mainshaft and gear-plus-hub bearing as far as the depth of locking, which have to be already in its place. Sealing rings are mounted in after jointing of case halves. Lock the mounted mainshaft bearing against shifting with shims and drift the bolts with centre punch.

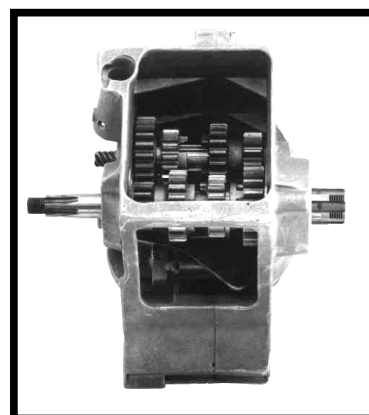
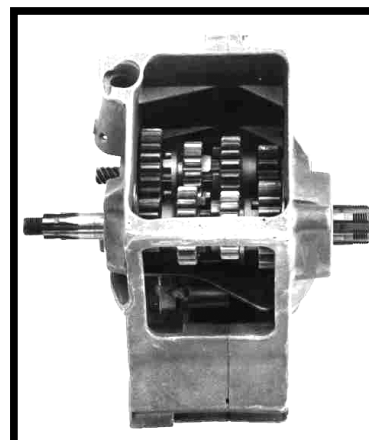


### 2.6.1. Exchange of sealing rings

The seal rings alone can be replaced while engine is in the frame. However the primary gear must be dismantled before. Also alternator and chain gear (1.9). Remove the lock pin and take off the damaged seal ring. Then check the true joint of the spring, oil the seal rings and drive the latter in place with the S-72 and S-92 jigs.

## 2.7. Gearbox

For the correct reassembly of gearbox it is recommended to begin with the crank mechanism removed from the crankcase halves in order to ensure the maximum clearance of the layshaft. To ascertain this clearance, fit the layshaft into ballbearing together with the 1st. speed gear and then clamp both crankcase halves together provisionally with several screws. Move the layshaft forward and backward to check its axial clearance which should be in the range from 0 – 0,6 mm. Then remove the layshaft and locate the crank mechanism with the centre face plate (if this plate has been removed) into the left crankcase half heated up to 100-120°C. The highest temperature has to be around the crankshaft bearing. Put wooden blocks under the front and rear part of the crankcase half and insert the crank mechanism into as fast as possible so that the lock pin of centre ring fits into the recess in the crankcase. It is not permitted to drive the mechanism into the bearing forcefully because this would result in its „uncentering“ and also in damaging of bearings. If the crank mechanism becomes jammed in the bearing, drive it out of the bearing (engine dismantling), reheat the crankcase and repeat the operation..



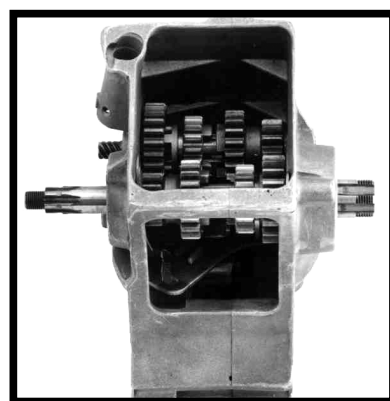
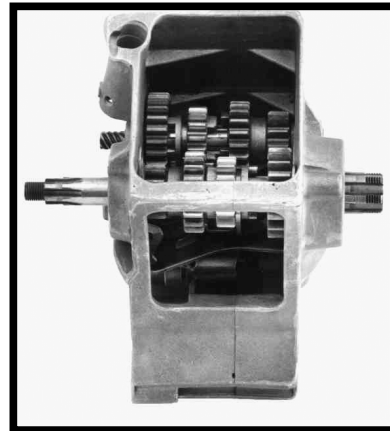
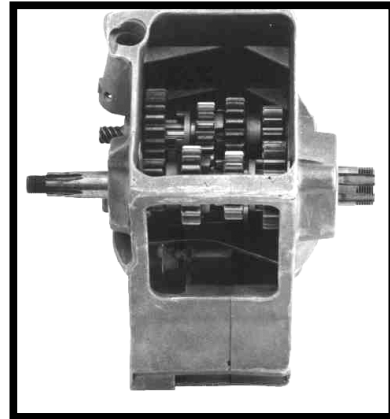
Set the gear shift gate in one of the centre positions (extreme positions are unsuitable). Then fit the mainshaft with the spacer and gear locked in the position with wireformed ring into the bearing in the left crankcase half. Fit the 16 tooth gear on the shaft splines with its three claws pointing downward.

Put shifter fork guide pins into the top and the bottom slots of the gate and fit the top fork into the 16 tooth gear on the mainshaft at the same time. Then thread the guide rod through the forks so that its shouldered end points downward. Locate the 24 tooth gear with its flat side toward the needle bearing, and place the 16 tooth gear on the bottom shifter fork with its three claws pointing upward. Join both gears by the layshaft with the previously fitted on and secured 19 tooth gear. Check gear shifting by turning the gear shift gate to the individual positions corresponding to the individual speeds (especially if a new gear shift gate is used) in the following manner.

**a)** Shift the 1<sup>st</sup>. gear and check whether the 16 tooth gear on the layshaft meshing with the 1<sup>st</sup> speed gear (24 teeth) has an axial clearance of at least 0,2-0,3 mm. Likewise check that, in this position, there is a clearance between the shifter fork guide pins and the end of the gate slots.

**b)** Shift the neutral between 1<sup>st</sup> and 2<sup>nd</sup> gear and check that the claws of the 16 tooth gear do not touch the face of 1<sup>st</sup> speed gear and also the claws of the 2<sup>nd</sup> speed (19 teeth) gear when lifting in the bottom shifter fork.

**c)** When shifting in fourth gear, the face of splined mainshaft should protrude 0,1-0,2 mm from the 3<sup>rd</sup> speed gear (16 teeth). At the same time check that the shifter fork guide pins are not abutting against the ends of the gate slots (see paragraph a).



## 2.8. Joining the housing halves

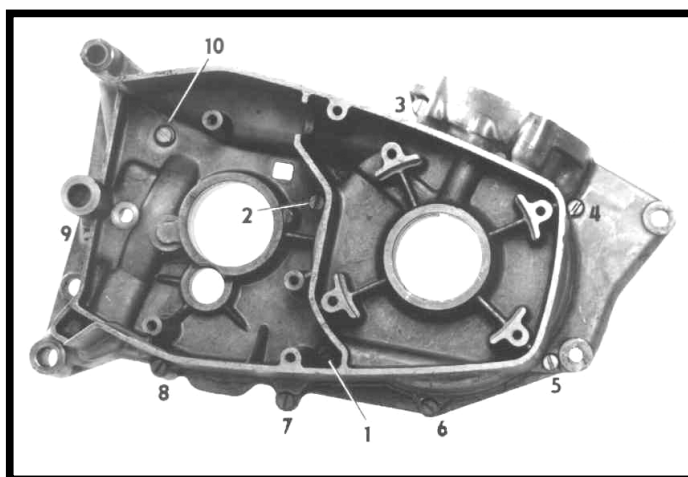
Heat the right half of engine housing the same way as the left one. Coat the left housing half sealing surface with sealing putty. Coat the gearbox shaft end and the right crank pin with oil. Engage the idling between the 1<sup>st</sup> and 2<sup>nd</sup> gears and move the right connecting rod in the top position to make it pass easier through the housing slit. Mount the mid insert in the housing mid recess. Heat the right housing half along with all bearings as well as the countershaft needle bearing well and join it as quickly as possible to the other half – while turning the gear plus hub to get the gears mate each other. Drive in the rear centring pin. Bolt tightly the two housing halves together with M6 bolts (start with mod bolts). Tighten the bolts once more after the housing is cool and clean the housing vent hole.

Using a pipe of suitable diameter tap on the ball bearing inner ring to achieve the true position of the balls in the bearing runway. Lubricate the bearings with engine oil. Drive on both crankshaft seal rings – before mounting make sure that they are duly joined with each other. Use S-72 drift for driving operation. Lock the seal rings to prevent their shifting. Tap down slightly the mid insert. For the next engine assembly steps clamp the engine front section in the vice and proceed as described above. Pour the oil into the gearbox as late as possible to allow the sealing putty -between housing halves- dry fully.



## 2.9. Mounting the engine into the frame

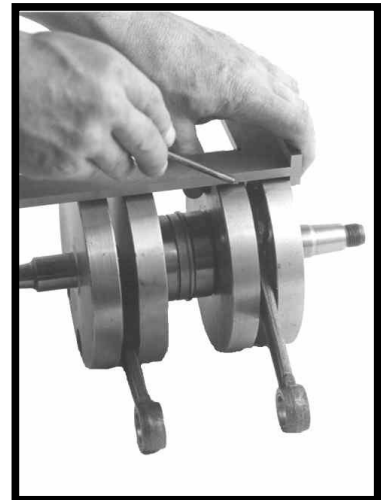
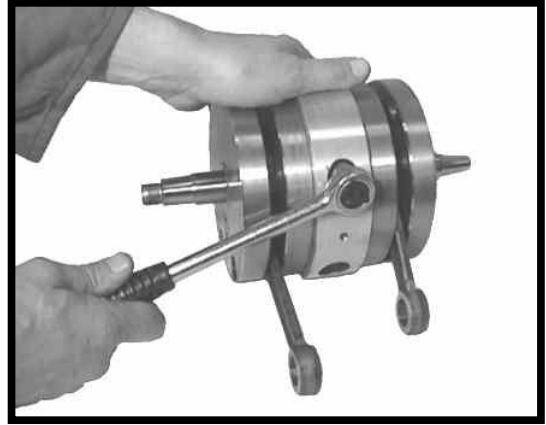
When mounting the engine in, proceed in reverse sequence of the disassembly. Before mounting the clutch disengaging holder, coat the ball under the adjusting bolt with grease. Once the engine is mounted in the bike frame and clutch cable attached, adjust the clutch release mechanism.



### III. CRANK MECHANISM DISMANTLING AND REASSEMBLY

#### 3.1. Crank mechanism dismantling

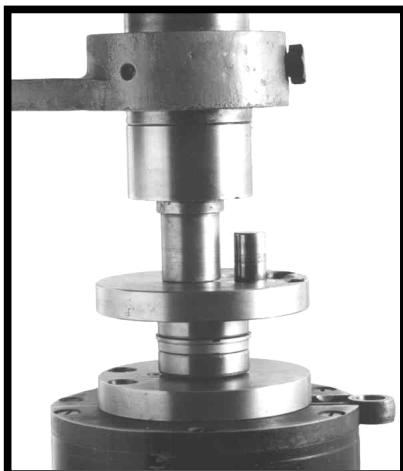
Using the nr.12 tubular spanner, unscrew the nuts holding together the two part face plate and separate two halves of the plate. Never use a chisel or a screwdriver for this operation. Apply a set square on to the flywheels and make index lines with the scriber to mark their mutual position. Preferably in  $90^\circ$  from the axis of the crankpins. For pressing the flywheel apart and for their subsequent pressing together, you will need a press with a pressure of about 8-10 tons and a special two part supporting jig (S-205 pressing jig). When replacing connecting rods (replace always the complete rod along with its pins) press out first the end flywheel, take off the connecting rod and press the mid bearing pin out of the nearest mid flywheel. Press the connecting rod out of the latter flywheel. If replacing the mid pin, labyrinth bearings or mid ring, dismount the crank completely to pieces.



#### 3.2. Mounting the crank mechanism

**a)** Press connecting rod pins in the inner flywheels, whereby the faces of the pins must get in line with the flywheel outer surface. The pins must face in the precise perpendicular position the flywheel surface. For this job use a set square or the guide, which is included in set of special tools for work on the crank mechanism.

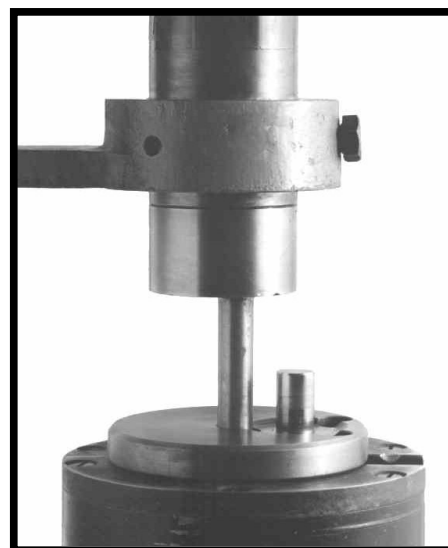
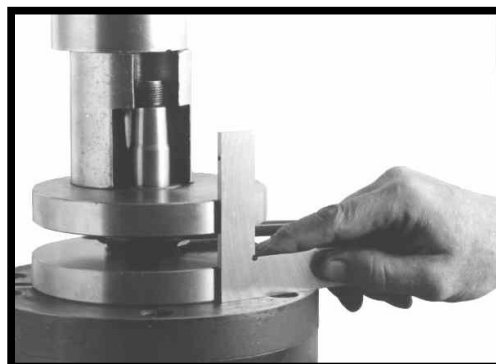
**b)** Fit the connecting rod with bearing and distance washer on the left inner flywheel pin. Attach the outer flywheel, adjust it with the set square and press it in. After having finished the pressing job, check the gauge lines the crank mechanism was marked with before it was dismantled (must be in line). Use a copper mallet for the readjustment



c) Then put the left half of the crank mechanism into the jig and use the S-204 guiding insert to press in the centre pin. Fit the bearing Nr. 6206 C 36 (packed with grease) and the distance ring on the centre pin. Smear the distance ring with grease and fit on it the labyrinth packing so that its lower part under the collar is turned toward the right half of the crank mech. Then press in the other bearing.

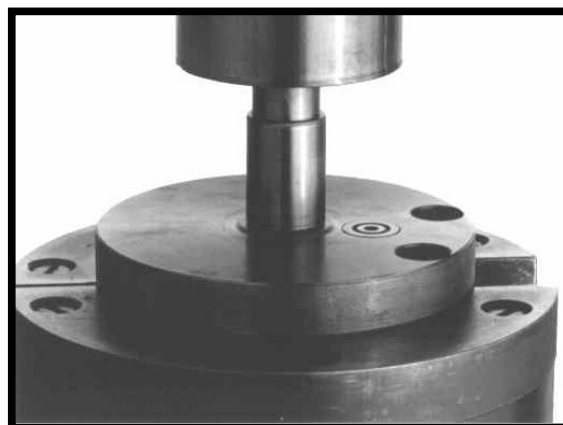
d) Fit the right inner flywheel on the centre pin (the crankpin is already pressed in) so that it is turned through 180°. After align it according to the index lines, press it together with the assembled left side of the crank mechanism

e) Fit the connecting rod with the bearing and distance ring on the crankpin of the right flywheel and then reposition the crank mechanism in the pressing jig, so that the largest possible area of the crankpin bears against the side of the press drum. Then locate the right outer flywheel, adjust it in the perpendicular position on the crankpin according to the index lines, and press the assembly together.



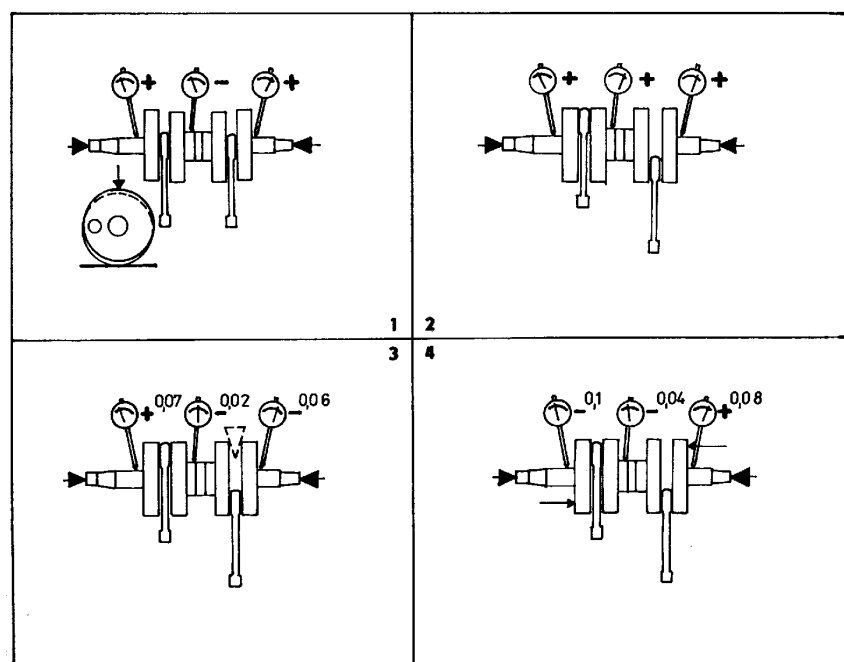
### 3.3. Crank mechanism – centering

Before the centering the crank mechanism check that the index lines coincide and that they are in a single plane. If necessary, tap the right or left flywheel with copper mallet and bring it to the required position. Check axial clearance of the connecting rod according to the limits given in the table. When centering the crank mechanism, never tap the flywheels or crankpins with the iron hammer. Use the S-201 lever or the S-203 special pliers only when it is necessary to spread the flywheels apart. Following description can be considered as a basic guide to the centering of the crank mechanism, because this job has to be done by experienced and skilled worker. For aligning the crank mechanism by tapping the flywheels, the mechanism has to be removed from the centres of the centering fixture. This fixture must be in perfect order to ensure that the measuring results will not be distorted. Here, also include instructions for removing the ascertained excentricity deviations exceeding those recommended by the documentation i.e. greater than 0,02-0,03 mm.



[illegible]





**Pic.1:** Flywheel surfaces are not in a single plane (do not coincide).

On the surface of the flywheel, mark with the chalk points where the indicator shows the maximum value. Take the crank mechanism out of the centres and support the middle flywheels so that the outside flywheel markings are on the top. Then tap the marked points with the copper mallet until the desired result is obtained.

**Pic.2:** Places where indicator shows the maximum value sign with the chalk. In our case the whole mechanism is bent. Take it out of centres, support one end flywheel in such a way that the signed places are on top. Hold the opposite end with a hand and tap with copper mallet on the middle flywheels – on marked places. Or you can use plies S-203 to expand the inner flywheels – still clamped in the centres- on opposite side of marking.

**Pic.3:** Left and right flywheels are closer to each other at the points opposite to the connecting rod pins. For expanding use plies S-203. Test the crank mechanism clamped between centres. If the closing is minor, the expanding operation can be done by S-201 lever. If the end flywheels are closed at the points opposite to the connecting rod pins, they must be forced apart. After having removed the crank mechanism from the centres, give the flywheels blows in the direction of arrow

**Pic.4:** Left and right flywheels are too opened and must be closed at the points opposite to the connecting rod pins. Take the crank mechanism out of the clamping and give the flywheel blows from the side indicated by arrow.

**Note:** Continue in centering and testing until you achieve the admissible radial run out of the crank mechanism, which must be less than 0,02-0,03. After having centered the crank mechanism test the axial play and mount the cleaned mid ring (face) on.

## IV. CHASSIS





### 4.1. Front wheel remove

Loosen and unscrew the nut of wheel shaft and remove the dust protecting ring. Loosen the clamping bolt of the wheel and shift out the shaft. Be careful not to lose the brake pads when removing the front wheel from the fork. After removing the wheel it is recommendable to enter between the brake pads a filler of -at least- the same thickness as the brake disc and secure it against falling out. During assembly watch the brake disc, to get easily slipped between the brake pads after having removed the filler. Shaft has to be clean and greased a bit. After slipping the shaft into the wheel, screw and tighten the nut. Push down the front fork several times and then tighten the wheel axle with the clamping bolt on the left slider.

### 4.2. Rear wheel remove

Unscrew the winged nut of the rear brake bowden and wheel spindle nut, remove the washer and pull the spindle out to right side. Then remove the brake reaction link with the spacer from left side and disengage the wheel from the rear wheel sprocket assembly. Tilt the bike to the right and take out the wheel with the brake cover with brake shoes. For refitting the rear wheel, reverse the procedure of its removal. Check the rear brake (wheel has not to drag) and correct installation of the brake reaction link in the guide on the swing arm.





#### Wire spoked wheels

		
	<b>130 kPa</b> (0,9 lbs/in <sup>2</sup> )	<b>160 kPa</b> (1,1 lbs/in <sup>2</sup> )
	<b>130 kPa</b> (0,9 lbs/in <sup>2</sup> )	<b>200 kPa</b> (1,4 lbs/in <sup>2</sup> )

#### Motorcycle with sidecar

<b>130 kPa</b> (0,9 lbs/m)	<b>270 kPa</b> (1,9 lbs/m)
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#### Alloy wheels

		
	<b>150 kPa</b> (1,05 lbs/in <sup>2</sup> )	<b>160 kPa</b> (1,1 lbs/in <sup>2</sup> )
	<b>150 kPa</b> (1,05 lbs/in <sup>2</sup> )	<b>200 kPa</b> (1,4 lbs/in <sup>2</sup> )
<b>Max. zatíž.</b>	<b>150 kPa</b> (1,05 lbs/in <sup>2</sup> )	<b>250 kPa</b> (1,75 lbs/in <sup>2</sup> )

### 4.3. Secondary chain

Proper care and correct tensioning of the chain are decisive for its function and lifetime. It is important for the chain to have necessary slack in every position of swing arm. For example the chain must never be stretched fully, whatever the position of swing arm. To adjust chain proceed as following:

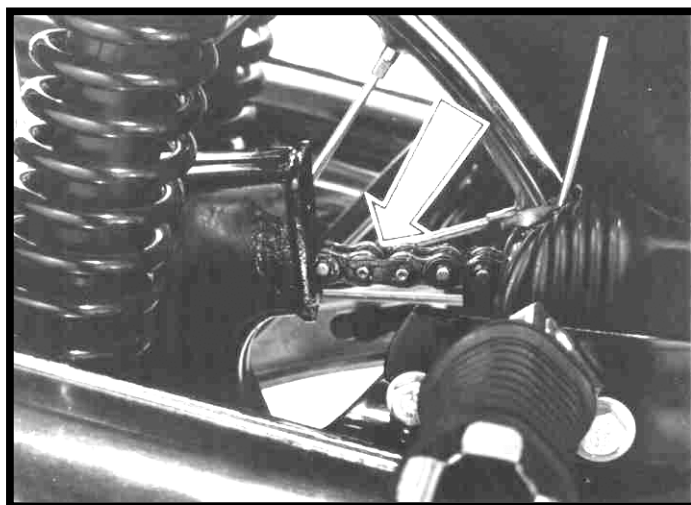
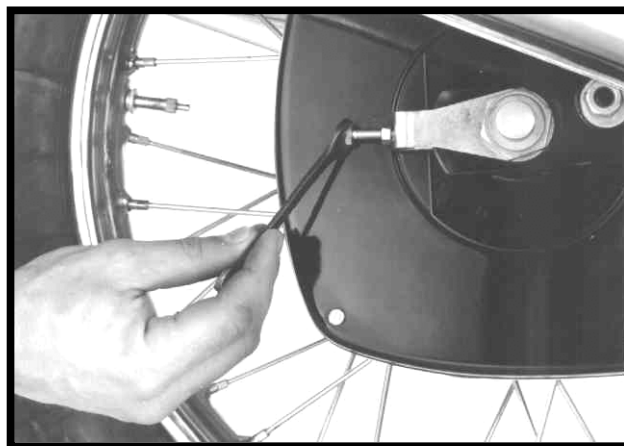
**a)** With a machine standing on main stand, loosen the nut of rear wheel spindle and nut of rear wheel sprocket bush. Then loosen M6 lock nut on chain tensioner on both sides of swingarm

**b)** Then tension or slacken the chain by gradually turning the screws of both tensioners by the same number of turns.

**c)** The chain is tensioned correctly if, after releasing the top rubber chainguard, the chain can be lifted at least 3 centimeters. This slack ensures that the chain will never be fully stretched during the ride due to the up and down movement of swingarm. This could shorten the lifetime of the chain or even result in damage of bearings (gearbox sprocket).

**d)** Than it is also important to align perfectly both wheels when adjusting chain. To measure alignment of the wheels, use a suitable adapted lath. A missalignment of the wheels (not in same track) unfavourably affects the riding characteristics of the machine.

**e)** After having adjusted the chain and aligned the wheels, first tighten the lock nuts on tensioners, and than nut of rear wheel sprocket bush and spindle nut. Recheck the tension of the chain one more and adjust the rear brake and brake light switch.



#### 4.3.1. Renewing secondary chain, without removing fully closed chainguard

The following procedure can be adopted for renewing the secondary chain when you have another chain of the same length - to be exchanged with

**a)** Loosen the nuts of rear wheel spindle and sprocket. Than loosen the tensioners and move the wheel forward as far as possible

- b)** Loosen the screw of rear top clamping sleeve of the rubber chain guard, and lift off the clamping sleeve. Pull the top part of the chainguard out of its mounting at the guard rear part.
- c)** Turn the rear wheel until the master chain link (connection) appears in the accesible area. To prevent falling of the chain left end into the metal cover, put a thin screwdriver or wire between the chain rollers next to master link. After pressing aside the rubber guard, secure the same way the right end.
- d)** Now dissconnect the master link and connect the end of the prepared new chain to the left end of the original chain.
- e)** Take away the screwdriver securing the end of original chain, lift the rear wheel and by carrefully pulling, slip the new chain on both sprockets. Be carefull not to damage painted or chrome plated parts  
Before disconnecting the original chain from the master chain link, secure the ends of new chain the way described under **c)** and remove the original chain. Then use a new chain link to join the ends of the new chain. In case you have removed the chain only for maintenance purposes, clean it and lubricate as usual, and refit it on the sprockets as described above, using an auxiliary chain
- f)** Refit the end of the top chain rubber chainguard into its mounting and secure it with the clamping sleeve. Tighten the chain well, as described.
- g)** Adjust the rear brake and brake light switch.

**Remember!** The clip of master chain link must allways be turned with the cut out to the direction opposite to the movement of the chain.

#### **4.4. Steering – replacement of bearing on the lower bearer. (Fuel tank and front wheel removed)**

To dismatle the headlamp cover, unscrew the lever of headlamp tilting, loosen the nuts of the flasher conduits and unscrew two M5s. Further, disconnect the switch of the front brake light and remove the main brake cylinder incl. mirror and lever. Place these parts carefully not to damage them later during the work.

By unscrewing the four bolts from the upper bearer, dismantle at the same time the handlebars (let them hang on bowdens) and instrument board (disconnect electrical wires and speedo and tacho drives).

For simpler assembly it is better to disconnect connectors of the ignition switch, the horn and earthing cable from the upper bearer

Further loosen and remove the upper plugs of the fork arms loosening at the same time the screws M10 on th elower bearer clamping the fork arms that we také out together with the mudguard.





After disassembly of the front fork a mudguard, put back the fork plugs to avoid pouring oil out of fork. Remove the headlight and indicators and let them hang on cabling or attach them to the frame in the suitable way. On releasing and screwing out the upper nut of the steering column (key S-81), take off the upper bearer.

Using the opposite side of the key S-81 loosen the lower nut of the steering column. Hold the lower bearer in upper position in order that the balls do not fall out from the bearings.

Remove the nuts and take out lower bearer carefully.

In case of an urgent replacement of the steering bearing shells, we use a longer bar to drive them out. At first, push the bearing shell from the lower bearer by means of sharp chisel on several spots and carefully take it out.

When reassembling, take care to have the bearing shells of the steering head filled with prescribed grease and to check if both bearings have 18 balls of dia 1/4" (6,35 mm).

**Notice:** Reassembly is executed in opposite way, always observe these principles. First retighten the lower nut of steering column and then loosen it just enough in order that the fork moves in bearing without play. Use S-81 for this job. Make sure about it and then secure the upper nut.

#### **4.5. Front fork**

##### **4.5.1. Removing front fork legs (front fork removed)**

- a) Remove the cover of headlight and dismantle the front brake caliper.
- b) Take off front mudguard (2 bolts M6x16, 4 bolts M8x20).
- c) Unscrew plugs of fork arms.
- d) Loosen bolts of lower bearer (M10x65).
- e) Screw the S-93 jig into the fork tube and tap the tube to loosen it from the bearer.

##### **4.5.2. Removing front fork slider and damper, exchange of seal**

- a) Release the sockets on the collars and strip both as well as the carrier pipes from the slider, take off the springs.
- b) Unscrew by imbus nr.8 screw M10x25 in lower part of slider and remove the slider.
- c) Remove the lock, sealing ring and remove the damper.
- d) Remove the lock which holds the seal in the top section of the slider and take out the seal ring. A new seal ring must be employed at each disassembly. The assembly proceeds in the reverse sequence. Before fitting in the spring, fill the assembled arm with damper oil (4.5.3) Mount the arm in the bearer, tighten the top plug and then the arm with the M10 bolt provided in the bottom bearer.

##### **4.5.3. Exchange of front fork oil.**

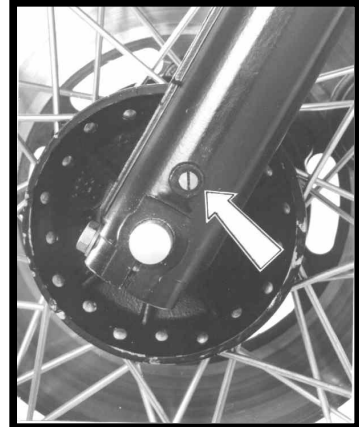
Engine oil SAE 30-40 is used for front fork filling.

Each arm contains 200 cm<sup>3</sup> of damping oil. In addition to the damping effect this oil also lubricates the slider bushes. When oil is changed for first time, we suggest to flush both absorbers with flushing oil.

- a) Perform first exchange of damping oil after 500 km.
- b) Then change oil periodically every 5000 km.

### Front fork oil exchange

- Loosen the drain screw from the fork.
- For faster draining remove also the top plugs.
- After all oil is drained out, flush the tube with flushing oil.
- Check sealing washers under the screw heads and tighten the screws.
- Fill up both arms with fork oil.
- Close the fork with top plugs.



### 4.6. Locking the motorcycle

Turn the handlebar to the right as far as possible. Put the key into the lock. Turn it clockwise and at the same time push it in. Turn the key back and remove it from the lock. Unlocking is the reverse procedure.



### 4.7. Removing the seat

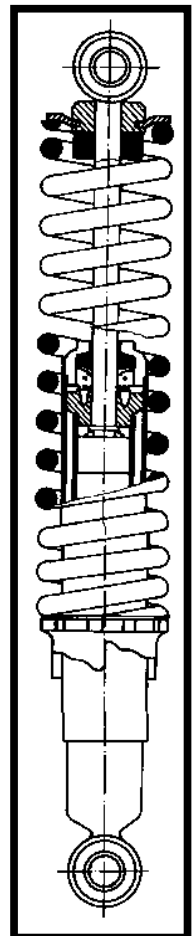
Put the key into the lock, turn it clockwise and simultaneously pull the lock out a bit. Lift the saddle in the front for about 10-15 cm and pull it out of the motorcycle. Put the seat back in reverse procedure.

### 4.8. Rear suspension

To dismantle the rear suspension unit for oil exchange or renewing the packings, clamp the lower eye of the shock absorber into the vice. Unscrew the plug (2) with the size 22 spanner, and pull the piston rod assembly from the shock absorber body. If the piston rod sticks in the working, tap the cylinder with a soft object to strike it off the guide. Whenever dismantling the shock absorber, put a new packing and sealing ring into the cap nut.

#### 4.8.1 Filling by oil and assembly

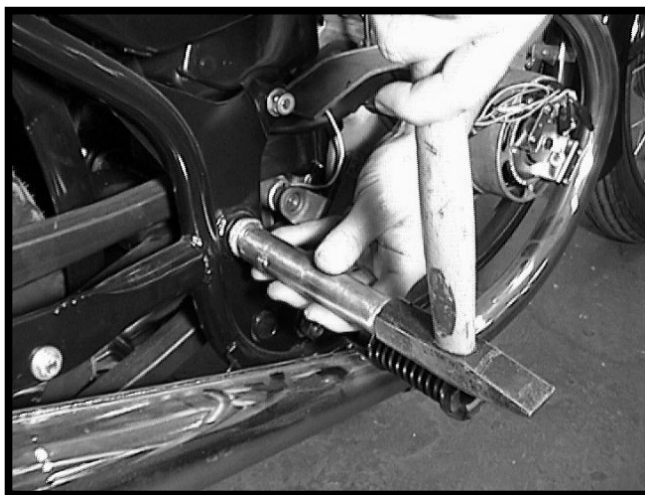
The suspension unit lower eye is still in the vice. Lace the working cylinder into the shock absorber body and pour in 0,047 litres of ON-1 damper oil. Carefully slide in the piston rod with the piston into the cylinder, and screw in and tighten the plug. Then check the correct function of damper by pulling and pushing the piston rod few times. In case there is a resistance when pushing down the piston rod, loosen the plug and operate the piston rod again to expel the air or surplus oil from the shock absorber. Then retighten the plug. Check if all silentblocks are undamaged, event. exchange them.



#### 4.9. Removing the rear swingarm (without disconnecting secondary chain)

Remove the rear wheel from the rear swing arm, detach the brake bowden and remove the rear wheel sprocket with cover while leaving them hang on the chain. Detach the rear suspension units and slide them out of the lower retainers after having loosened the upper retainers for about 4 turns. Unscrew the M10 nut on the left side on the brake pedal shaft and use a soft mallet to drive out the shaft with the brake pedal to the right side.

Unlock and unscrew one of the nuts of the swing arm shaft, drive the shaft out of its bearing with an aluminium drift and take out the rear swing arm. After removing the dust covers, remove the metal-plastic bushes.



#### Caution! :

These metal-plastic bushes have to be put rough side outwards! The pin of the brake reaction link must be on the left side and the rear ends of the arm must be lifted above the exhaust silencer before sliding them in their mountings. Take care that the cover plates and the packing rings do not fall out.

#### 4.10. Rear brake

Rear brake of motorcycle needs to be adjusted only sometimes, when brake lining is worn. This is manifested by longer way of brake levers. The brake cam is provided with brake-lining wear indicator. When the indicator reaches its extreme position, exchange the brake shoes to ensure safe riding.

#### 4.11. Disc brake Jawa

Front disc brake Jawa is composed of four main components.

1. Master cylinder with lever, a part of which is a can for brake fluid and a front brake light switch.
2. A pipe with inlet bolt
3. Caliper of discs brake
4. Brake disc



### **Disc brake – put into operation (new or after repair)**

Tighten all pressure tight joints, pour the brake fluid into the reservoir of main brake cylinder. By repeatedly pressing the front brake lever pump the fluid into the entire brake system. (to do it faster you can carefully inject fluid into the brake caliper through the deaeration screw). If you manage to fill the whole system with brake fluid, you have to deaerate it in order to obtain a 100% braking effect

Slide a transparent hose over the deaeration screw on caliper and dip its other end into the glass with brake fluid. Press several time the brake lever and with constant pressure on the lever, loosen the deaeration screw a bit. Then tighten it again. Repeat this operation as long as there are bubbles going out of brake caliper. Take care to have all the time enough of brake fluid in the master cylinder reservoir and to have end of hose in brake fluid in the glass.

Operation and the maintenance of the hydraulic disc brake

### **Check before every ride**

Optical check of brake fluid level and leaking of the fluid from the whole system. Check function of brake light switch. If the level of fluid gets under 1/2 of control window, add brake fluid, maximally to the top of window. This check is done when bike stands on wheels with one person in seat.



### **Check every 2.500 km**

Optical check of brake pads wear, lubrication of brake lever pin.

### **Check every 5.000 km**

Remove the brake pads, check thickness of the lining. Minimum is 1,5 mm – otherwise pads have to be replaced with new ones. The brake pads are to be mounted with bevel toward the bigger diameter of the disc.

Beware! When pads are removed, do not move with brake lever. You could push out the piston from the caliper. Brake disc should have min. 4,5 mm.



### **Check every 25.000 km or 2 years.**

Demounting brake caliper, check parts, exchange of brake fluid, dust and seal rings. Undertake this work in authorized service, use suggested brake fluid, protect screw joints against the corrosion.



**Check every 50.000 km or 5 years**

Complete dismantling of brake system (master cylinder, caliper). Check functional surfaces, exchange all rubber parts (sealings, dust rings, connecting hoses). Undertake this work in authorised service.

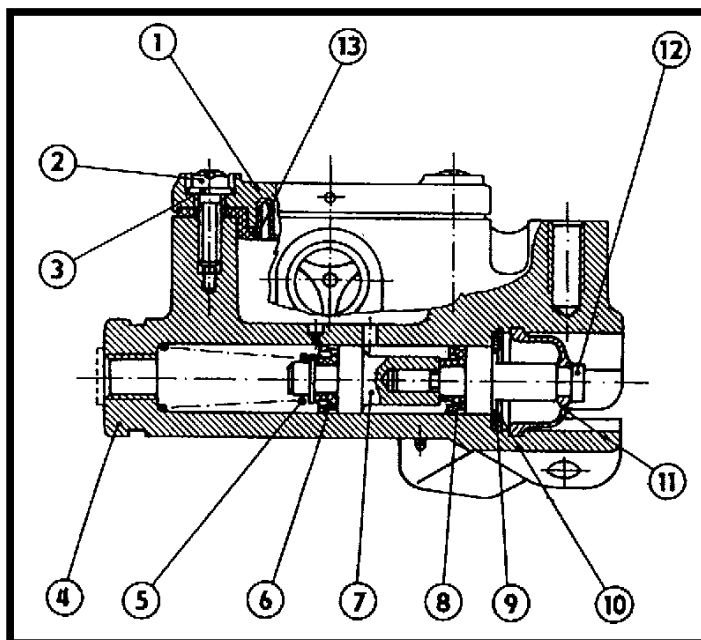
Service limits have to be checked every 50.000 km or once after 5 years.

**Dismantling of the brake caliper**

First properly clean caliper with denatured alcohol (pads removed). Remove three imbus bolts and separate both halves of the caliper. Remove the elastic insert and rubber sealing, then you can take out both pistons. In case of damage exchange also both sealing rings.

**When completing caliper watch to adhere following principles:**

1. Smear parts with conservation and preserving fluid – brake producer uses BREOX fluid. Dip new sealing ring of piston into this fluid for 1 hour before mounting in.
2. Insert the sealing ring into the groove of the cylinder.
3. An anti-dust sleeve shall be fitted on the piston into the groove and the piston shall be carefully slipped into the caliper's cylinder until its bottom position. In this position the sleeve can be slipped into the groove on the outer periphery of the caliper's cylinder. Put an elastic insert piece into the excision in the left half of the caliper, using a packing ring to seal the surface between both halves. Then screw both halves together with three imbus bolts. Brake pads insert into the caliper just before the mounting of front wheel.



- 1 - cover
- 2 - bolt M5x14
- 3 - washer 5,3
- 4 - master cylinder
- 5 - spring
- 6 - front cup
- 7 - front piston
- 8 - rear cup
- 9 - washer
- 10 - lock ring
- 11 - dust ring
- 12 - rear piston
- 13 - bellow

**Dismantling of master cylinder**

After discharging brake fluid, unscrewing the connecting hose, removing the lever and careful cleaning with denatured alcohol. After removing of dust cover and lock ring it is easy to pull out all internals.

**Assembly of master cylinder is reverse of disassembly, follow these principles.**

- a) Take care not to interchange sleeves on the pistons and not to damage them during the assembly.
- b) Maintain maximum cleanness, put new rubbers into BREOX fluid for 1 hour.

**Maintenance – exchange of front brake disc**

Exchange the disc when it is worn out or damaged. If there are sharp marks on the surface exchange the disc. This phenomenon is quite normal. Prior to mounting the disc, 6 shrims are placed on the screw holes in hub. Into the holes on disc 6 bushes and disc is fixed by M8 bolts.

#### 4.12 Exchange the ball bearing of the rear sprocket.

After removing of rear wheel, unscrew with 32 mm spanner the nut of sprocket, which we remove from the swing arm also with cover. Detach the sleeves on the rear end of chain cover, remove two M5 bolts and separate both halves of the chaincover. Now you can lift off the sprocket without disconnecting the chain. Than carefully press or drive out the spacing bush and proceed to remove the spacer. The dust cover and the bearing lock ring from the right side of the sprocket. Using a suitable tube drive out the bearing from the side of the driving lug and then press home the new bearing using a tube with diameter of outer bearing ring. Never drive the bearing over the inner ring – this would amage the bearing. Prior to refitting the dust covers fill the bearing with grease PM-LA-2.



#### 4.13. Exchange of ballbearings of front and rear wheel.

Remove the cover of brake drum with brake shoes, and carefully remove the dust covers from both sides. Unlock the bearing and from other side drive the bearing so far as the primary unlocked bearing falls out. Remove the distance tube and stamped washer of the bearing. The other bearing drive with the tube back to the other side of hub.



#### To refit the bearings proceed as follows:

First put the stamped washer in that side of the hub where the bearing is secured with a lock ring with the convex side of the washer turned inside the hub. Using a suitable tube, press in the new bearing (apply the tube on outer ring) till it bears against the washer and secure it with the respective lock ring. From the other side insert the distance tube (into the middle of the stamped washer) and then press home the other bearing. The bearings and also partly the hub must be packed with PM-LA2 grease.





#### 4.14. Removing of fuel tank

Close the fuel cock and detach the fuel hose. Take off the saddle, side cases and unscrew the M6 bolts holding the tank in the rear. After removing the silentblocks pull up the tank a bit in the rear part, pull it out to the back.

#### 4.15. Filter box removing

When seat, side cases and fuel tank are removed, take off the plastic cover sealing the under-seat- space from dirt. Detach the connection between carburettor and filter box. Unscrew the bolt holding underseatbox and filter box together. Tip the filterbox forward and carefully remove the box from the frame.



#### Air filter - exchange

Air filter is placed in the filter box and is accesible from the right side of the motorcyle. Remove the seat, side cover and unscrew the bolts M6 from side cover of filterbox. Remove the cover and take out the old filter. When fitting a new one be sure to sit it truly, the side cover is also centring element.

#### 4.16. Exhaust silencers exchange

Silencers should be exchanged after 25 000 km.

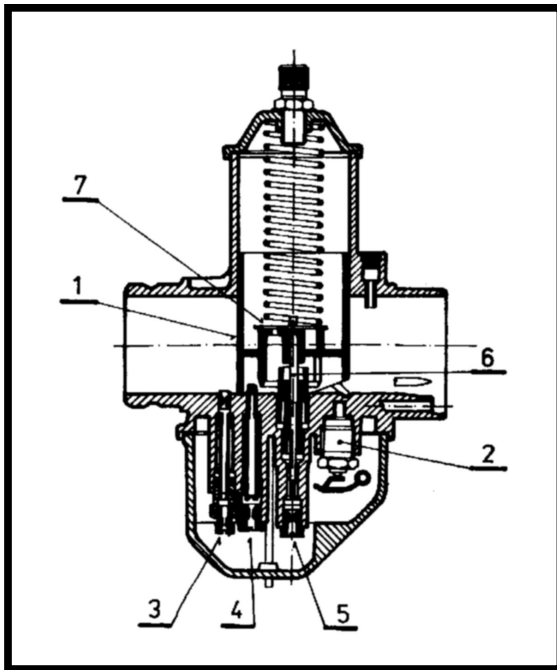
#### 4.17. Carburettor

##### Technical data

The carburettor setting is determined according to tests results. Basic adjustment is done by the factory. Needle position is 1<sup>st</sup> notch from the top. Idle screw is backed off by 2 turn. Level of fuel in float chamber is 11+/- 1 mm (measured from carburettor body and float chamber dividing plane at pressure of 1,837 kPa (250 mm fuel column) Used jets are signed with SOMET-JIKOV flow values.

##### Typ 640

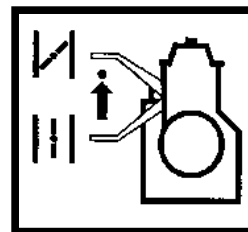
<b>Main jet</b>	100
Auxiliary system jet	72
Auxiliary air jet	120
Fuel economizer jet (Ekonomostat)	50
Choke jet	85
Idle jet	40
Auxiliary idle jet (at idling orifice)	80
Idle screw	1 ± 0,5 ot.
Needle position	1 <sup>st</sup> Notch from top
Needle valve	Ø 2



#### Legend

- 1 – Sleeve valve, complete
- 2 – Needle valve, Ø 2 complete
- 3 – Idle jet (40)
- 4 – Jet of auxiliary system (72)
- 5 – Main jet (640 - 100)
- 6 – Fuel metering needle
- 7 – Needle securing clip

Carburettor is for better starting equipped with choke, which is controlled by lever on carburettor body. The choke is „on“ in its upper position, „off“ in lower position.



## V. ELECTRICAL EQUIPEMENT

5.1.	List of bulbs	Use	Pcs.
	Bulb H4	12V-60/55W Headlamp	1
	Bulb	12V-45/40W Headlamp	1
	Bulb	12V-R10W Brake light	1
	Bulb	12V-21W Indicators	4
	Bulb	12V-R5W Rear light	1
	Bulb	12V-4W Parking light	1
	Bulb	12V-2W Control lamp	4
	Bulb	12V-2W Speedometer lighting	2
	Bulb	12V-2W Rev counter lighting	2



## Adjustment of headlamp and rear suspension

Load of motorcycle	Rear suspension setting		
	Position II.	Position III.	Position IV.
No load	1	-	-
1 person	1	-	-
2 persons	-	2	-
2 persons + baggage	-	-	2

1 – headlamp in basic position –1,3%

2 – headlamp in inclination position

**5.2. Exchange of bulbs in headlight**

Take out the headlamp insert, remove the terminal board and then push and rotate the plastic socket anti-clockwise to disengage it. By pulling it out, you will also release the socket of the parking light bulb so that it can be removed from the headlamp reflector insert. To remove the main twin filament bulb, proceed the same way. When reinstalling it, take care that it fits correctly in the cut outs of the headlamp insert. Likewise the collar of the plastic socket must fit in the recess of the headlamp insert collar and the flexible contact must touch the base of parking light bulb.

**5.3. Spark plugs (shoes without resistor)**

Make	type
BRISK	NR15C, N15C
CHAMPION	L78

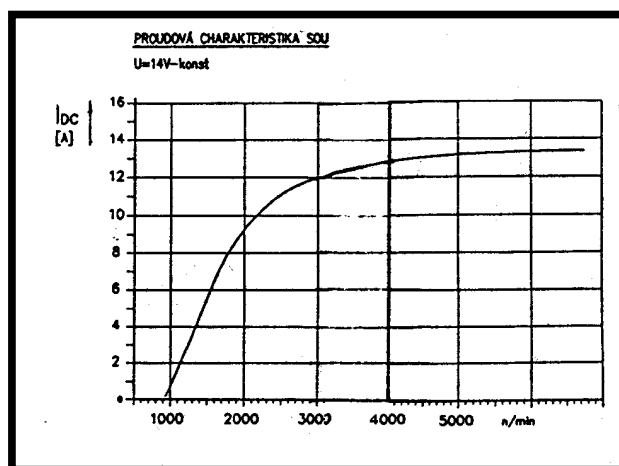
**5.4. Ignition advance adjustment**

Ignition advance is adjusted on value 2,5 mm before T.D.C. of piston. When mounting a sensor, the marking on sensor capture is positioned against on stator plate.

**5.5. Contactless ignition**

The set of contactless ignition contains of magneto A67-1 (rotor A67R-1, stator A67S-1), sensor SO1T, regulator R67 and ignition coil Z67. High voltage cable outlets from ignition coil are protected by rubber hood.

The reverse binding (reversal of poles) of battery causes damage on regulator R 67. The aluminium plate of stator is fixed to crankcase with 3 screws M6x20 cheese head and with one screw M6x20 steeple head (sensor). The sensor is fixed to sheet holder and is fastened with screw M6x16 top stator plate. When shifting the sensor, the ignition advance can be adjusted. The distance between sensor and rotor projection is 0,4-0,5 mm. Use jig S-97 for driving the rotor. Any change of connection, eventually thickness of wires which doesn't correspond to the original cables is forbidden.



### Set of source and ignition system Vape (technical description for service purposes)

The set contains :

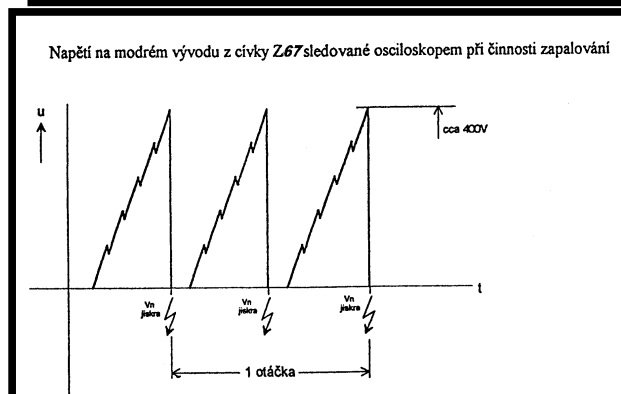
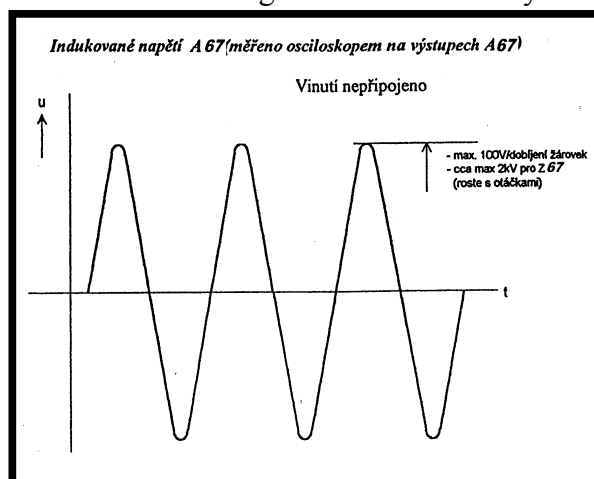
- **electronic switch Z67** - ignition coil with two high voltage outlets for two plugs of two stroke engine, controlling element of performance which governs primary coil winding
- **regulator R67** - electronically controlled semiconductor power - rectifier , which maintains the central value of direct-current voltage=14 V in electrical network and on battery of 12 V. The controlling and performance circuit is built in aluminium cover serving as a cooler of power-rectifier.
- **sensor S01** - induct. sensor containing permanent magnet and coil with winding. The voltage puls induce itself into coil at the moment when projection placed on outer circuit of rotor jacket is passing the sensor core.
- **alternator A67** - alternator is composed of stator and rotor. On stator (star-shaped form) is placed one black coil (feeding ignition coil Z67) , 10 source coils (serving as chargers of battery - through regulator R67 - and of lighting of motorcycle. Rotor contains 12 pcs of permanent magnets, there are two projections on circuit determining together with sensor S01 the moment of spark flashover. The spark is generated twice to one engine revolution always at the moment when projection is passing the sensor core.

The mentioned system differs in concept from existing system Vape type Z04. The coil Z67 is based on principle of capacity , i.e. energy for spark is obtained of condenser discharging. The source of current for this condenser is one black coil on alternator stator A67, i.e. not battery 12V. This is the basic difference when comparing with existing system Vape Z04 where the energy source was the battery 12V.

As there is no connection between ignition coil Z67 and battery 12V (with exception to the connection through motorcycle frame), the spark will be generated even if the battery is not mounted on motorcycle. As regards the placement of Z67, there is still valid the requirement of the same building-up as for former Z04. It means to place coil into cooling air flow and to move it maximum away from emitted heat of cylinders head. The advantage of coil Z67 is the decreased heating-up when idling engine revolutions.

Coil Z67 collaborating with rotor A67 does not enable to start up the engine on opposite side than wished following to marked projection on outer circuit of rotor jacket and input circuits in coil Z67.

The using of sensor S01 is very similar to that of system Z04. For the correct function it's obligatory to keep the prescribed space between S01 and projection on rotor. The correct setting-up oscillates between 0,4 - 0,5 mm. If it is not possible to maintain this spacing, we chose as priority lower spacing (0,3 mm) than higher one.



On testing machine it's not recommended to let turn alternator A67 to opposite side than the engine operation is prescribed, i.e. to more than 1.300 engine revolutions/min. During this working operation the voltage on condenser is getting increased over 400V. When opposite side of alternator working, the coil Z67 will only run on 2.000 revolut./min. approx.

Controlling on testing machine we can notice when sudden change of revolutions, e.g. from 1.000 rev./min. to the right instantly to 1.000 rev./min. to the left, following situation: immediately after the changement of revolut. direction, the coil Z67 sparkles even when opposite (lefthand) run and approx. within 0,5 sec. this effect is disappearing (the switch doesn't sparkle). This "memory" effect can be called as normal.

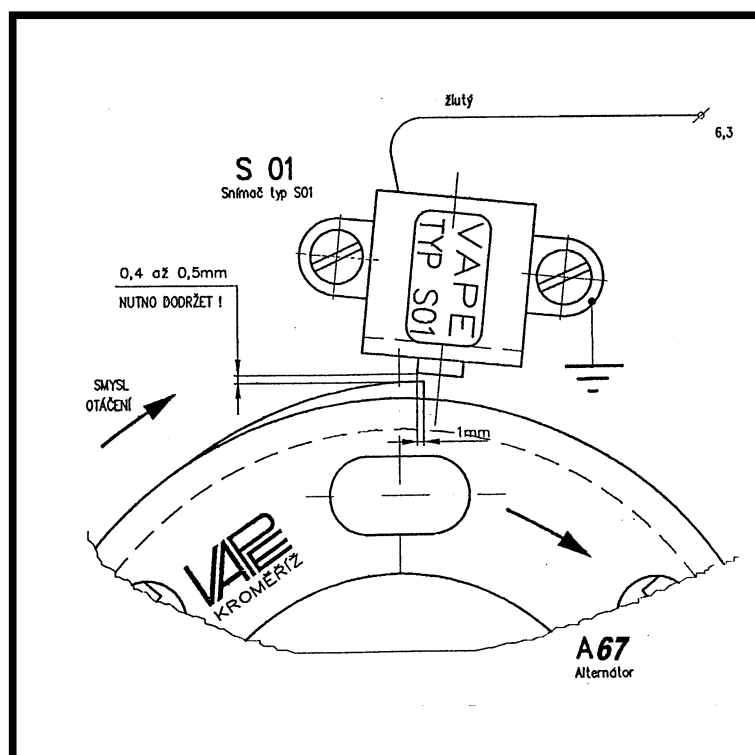
**The system of charging the battery and lighting of motorcycle** is based on another principle than the existing one, which is using alternator with rotor excitation through carbons.

Alternator A67 is using as an energy source the permanent magnets the energy of those is induced into coils on stator during rotor revolutions. The outlets (cables) from alternator A67:

- two wires - one red and one white charging condenser in coil Z67
- two black wires charging the battery 12V via regulator R67 and providing current for lighting

The voltage induced to coils on stator is always alternating. According to the need it has to be rectified using regulator R67

The principle of regulation: the load (of battery, lamp) is connected and disconnected to winding on stator in such a way to keep the middle value of direct-current voltage = 14V on battery. The over energy from alternator A67 is therefore not utilized that means there is lower coil heating-up on stator A67.



### Notes to individual components :

#### **Sensor S01**

Sensor resistance =  $200\Omega \pm 20\%$ , measured by direct-current ohmmeter. This value is valid when environs temperature reaches 20 C. If this motorcycle component is heated over the named temperature, the resistance will be increased on  $250\Omega$  approx. On the other side when freezing,, the resistance value is inferior to reach approx.  $160\Omega$ .

The measured resistance values (at temperature 20 C) inferior to  $150\Omega$  and superior to  $250\Omega$  indicate the defect (e.g. temporary winding short-circuit, event. winding breakage).

The short-circuited sensor S01 ( resistance  $< 10\Omega$  ) represents on outlet weak signal and Z67 cannot generate the spark. The totally open circuit S01 can under some circumstances generate puls voltage, which synchronizes coil Z67 and generates the spark. In this case it is possible to increase the starting revolutions by signalization. The increased starting revolutions can also be caused by partial short-circuit.

Puls voltage generated S01 is increasing together with rotor revolutions and is lowest when starting-up. Its loss is from these reasons most apparent.

The eventual short-circuit of outlet conductor from sensor S01 on frame doesn't lead to its damage.

The switch of the sensor outlet on + battery pole doesn't damage sensor, if this wrong switching on is repaired within 5minutes approx.. On the contrary the switching on S01 to alternator circuit (e.g. through short-circuit in motorcycle cables) can cause damage of this sensor.

In all these cases motorcycle stops, because the spark won't anyway be generated or it will be on wrong engine cycle place. Being thus wrongly switched on and at the same time the alternator winding and coil Z67 are connected, too, there is a danger of damaging the coil Z67.

**Summary :** no harm for S01 to be short-circuited on frame, but the damage can be caused by connection to another sources of electrical voltage.

#### **Coil Z67**

The source of energy is the charging (black) coil on stator. It is connected by means of two conductors (red and white). The blue conductor serves to switching off the engine and can be short-circuited on motorcycle frame only(= coil center Z67). The yellow conductor is connected to sensor S01.

On high-voltage outlets one can read as far as 35 kV voltage . One spark is always positive and the second one always negative. One spark is always in advance 2,5 mm in front of the top dead center and second one always in the engine exhaust phase. After the revolution of engine of 18 the situation interchanges. The cylinder in "exhaust" is in front of the top dead center etc. The coil center becomes thus the frame point of Z67.

#### **Diagnosis :**

1. The resistance between yellow conductor and frame =  $120\Omega$  ( direct-current)
2. The resistance between blue conductor and frame is very high( $> 50\text{ k}\Omega$  ). This indication is informative only and can be influenced by type of testing machine. Practically speaking it is the information very unreliable for control.
3. The resistance between red and white conductor mutually or against frame is very high, too ( $> 40\text{ k}\Omega$  ). This information is also very unreliable and the same statement as ad 2) is valid.





4. The resistance of secondary winding (measured on Vn outlets) =  $6\text{k}\Omega \pm 10\%$ . For first series (7th month of 1996) the coils with resistance of  $7\text{k}\Omega \pm 10\%$  have been used. The measurement is in principle direct-current (PU 120 etc.)

*Attention !!* There cannot be in any case red, white a blue conductors Z67 connected to battery (even for short period). These conductors cannot be connected to source winding of alternator (for charging of the battery), neither. This winding on A67 and battery produce high current ( $> 5\text{ A}$ ), that usually damages the performance element inside Z67. Subsequently Z67 is definitively out of use.

The big short-circuited currents flowing through coil and its circuits signal different "burls" on surface of coil casing. This place was affected by local overheating of some part. When functioning normally, the winding charge in stator is not capable to provide this damaging performance.

Short-circuit of Vn outlet on frame or short-circuit between Vn outlets mutually do not menace the coil itself, but the motorcycle stops.

Yellow conductor (from S01) must not be in any case connected

- with charging winding of alternator. Especially under higher revolutions ( $> 2000\text{ rev./min}$ )
- with winding for headlights and battery charging

The supplied performance will damage quickly (approx. within 10 sec.) the entry parts in Z67. If there happens to connect yellow conductor to battery, it's necessary to disconnect it quickly (within 5 sec. max.), otherwise the entry parts in Z67 are damaged.

The preceding points show that (S01 and Z67 being switched on) there is a higher danger for damaging Z67 than S01 when + battery 12V is getting on connection between S01 and Z67.

If the engine cannot be switched off by means of blue conductor, one can use from necessity :

- a) disconnection of red and white conductors
- b) short-circuit of red and white conductors between them
- c) short-circuit of yellow conductor on frame
- d) disconnection of yellow conductor from S01

All four variants of how to switch off engine can be used when idling only (i.e. up to  $2000\text{ rev./min.}$ ) with the exception of point d) which can be used even when revolutions exceed  $2000\text{ rev./min.}$

In all the case the frame S01 and frame of coil must be perfectly connected electrically, otherwise there is a danger of increased starting revolutions, eventually the spark in wrong advance. If the spark is getting weak it's possible that Vn coil is in partial short-circuit. We shall find it by measuring of secondary winding resistance. (*Note* : Coil heated in operation presents resistance of approx.  $7\text{k}\Omega$  and coil out of operation with environ's temperature  $20\text{ C}$  presents resistance of  $6\text{ k}\Omega$ ). Measured resistance bellow  $5\text{ k}\Omega$  signals partial short-circuit on coil winding, when winding disconnected (resistance  $> 20\text{ k}\Omega$ ) the spark can get weaker.

The other possibility of weakening of the spark is the leakage of red conductor on frame. This matter is connected with alternator A67, too.



## Alternator A 67

The stator of alternator contains two types of winding.

1. Charging winding for feeding Z67. The resistance of winding =  $820\Omega$  (measured direct-current). In heated state in operation the resistance will reach  $1.000\Omega$  -  $1.200\Omega$ . The voltage impulses of even 400 V are generating during operation. This winding is providing the maximum current of approx. 0,2 A. It can be short-circuited without its successive damaging. The first serie A49 of 1997 presents the resistance of charging coils approx.  $1.160\Omega$  under temperature 20 C and approx.  $1.600\Omega$  in heated state. The preceding type of stators of alternator A30 have presented resistance of charging coils of  $1.180\Omega \pm 10\%$ .

### Attention !

Stators A30, A49 and A67 are not in any case interchangeable. The same with rotors A30, A49 and A67. Rotor A30 doesn't allow to suppress the left-hand engine run.

2. The source winding presents small resistance approx.  $0,4\Omega$  -  $0,5\Omega$ . The battery source winding generates alternating voltage to amplitude 100V. During operation the alternator is getting warmed up to temperatures near to 100 C. When testing separately from motorcycle it is necessary always to connect the switch Z67 with charging coils. Not loaded charging winding provides voltage higher than 1200V under higher revolutions ( $> 4.000$  rev./min). There is danger of breakdown and damage of winding.

The core(spider) must be separately connected with motorcycle frame. It is necessary to avoid the short-circuit on stator core. The windings are insulated even from each other.

If there happens that some of outlet conductors signal the ohmic short-circuit or leakage on frame, event. short-circuit between windings mutually (black and copper coils), either decrease of lighting performance and warming of regulator R67 takes place or decrease of spark performance takes place, because one end of winding for coil Z67 will be framed. Only 50% of energy will get into Z67. It's very dangerous to connect circuit of charging coils (black) and source coils (copper) on stator A67. Under higher revolutions ( $> 2.000$  rev./min) Z67 will be damaged.

Rotor of alternator contains 12 permanent magnets. Any of two adjoining magnets have always to have opposite orientation of magnetic field.

## Regulator R67

It is monophasic and is connected to source winding on alternator A67 (by means of black conductors). All needed connections are led through two two-pole and one single-pole terminal boards.

Two of them (black) represent entries from alternator A67. Both are interchangeable and equivalent as on A49 as on R30.

Red conductor is connected to + battery pole

White conductor on terminal board is frame. The aluminium cover is conductively connected to frame by negative pole.

Green-red conductor serves for charging control



Regulator R67 is warmed up during operation the more the higher performance it is providing to bulbs and battery. It has to be cooled by air circulation. When motorcycle is on stand, slight current from battery flows through regulator to frame. This current represents less than 0,5 mA. If the regulator is warmed up, the current is higher (even several mA). After cooling of R67, current is decreasing. No need to disconnect battery from regulator when motorcycle is out of operation.

The most important when in operation is the proper connection of all the resp. parts. The eventual loss on transitory resistances is influencing intensity of regulated voltage.

The battery cannot be connected with regulator in opposite way. The resulting damage cannot be repaired. The battery cannot also be changed with some entry terminal connector (from alternator).

Regulator is set-up on 14,2 to 14,4V with battery charged and without attached "load". If there are other consumers joint, e.g. 63W (3 x 21W) under 4.000 rev./min., the voltage decreases to approx. 14 V. After warming up R67, the U(REG) is decreasing of about 0,1 to 0,2 V (saving battery in heated environment).

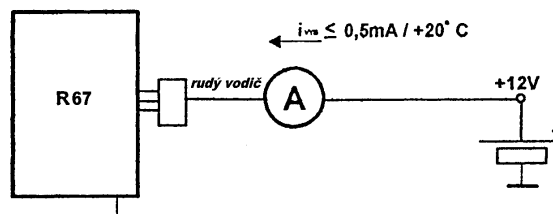
Regulator R67 allows machine to be in operation even without battery. The output voltage moves from 12V to 15V according to attached "load" on outlet R67. Most intensive voltage is registered under lowest "loads" (e.g. 5 W). The "horn" and indicator switches are working wrongly in such a case. The measuring of resistance between individual blades 6,3 on terminal board, event. against frame can be considered as informative, only. The framed blade has to have short-circuit on A1 cover R67. Other contacts represent high resistance (50 k $\Omega$  and plus). If somewhere the resistance is inferior to 1 k $\Omega$  event. if short-circuit appears, this is the question of defect.

Important values that can be ohmically measured :

1. S01 - resistance = 200 $\Omega$   $\pm$  20% under temp. 20 C; direct-current
2. Z67 - resistance of secondary coil = 6 k $\Omega$   $\pm$  10% ; direct-current under 20 C
  - resistance of yellow conductor against frame = 120  $\Omega$
  - leakage between secondary coil and other parts Z67 is not permitted
3. A67 - resistance of charging winding = 1.160  $\Omega$   $\pm$  10% under 20 C, measured direct-current
  - resistance of current winding = 0,4 to 0,5  $\Omega$  under 20 C
  - leakage event. short-circuit of individual windings on stator core event. between windings mutually is not permitted
4. R67 - No resistance can be definitely measured, only the resistance between A1 cover and blade 6,3 mm

### The steps detecting defects in circuit of charging of battery and regulator R67

1. Provided that ignition set is operational and motorcycle can start
2. Check-up the winding circuit on A67 ( $0,5 \Omega$ ) by means of ohmmeter
3. Verify that there is not short-circuit of this winding on frame. Points 2 and 3 execute on disconnected terminal boards of R67



4. Verify connection of battery pole with regulator R67 pole(frame); check-up ohmically if the connection really exists
5. If the connections are really O.K. you can connect directly both filaments of auxiliary bulb 40/45W/12V to winding A67 (through disconnected terminal board). This bulb must normally give light when engine revolutions reach 2.500 rev./min. The alternating voltage moves around 14 V. If the bulb is alighted, the alternator A67 is O.K. ATTENTION : If the revolutions exceed the norm the bulb gets burnt
6. If the regulated voltage on battery exceeds 14 V, and all the electrical consumers are switched off, it's R67 which is defected or the battery is discharged
7. If the voltage following point 6 is O.K. and is decreasing to less than 13,3V, under the revolutions exceeding 3.000 rev./min. with attached "load" of headlight, it's either the battery which is discharged or there is defect on R67 (verified by accumulator).
8. If the battery is O.K. but still discharged = check-up the possibility of short-circuit somewhere in cables, event. what loads are connected to motorcycle electrical network. (system overloaded).
9. If all the points 1-8 are O.K. and battery is not yet charged enough, measure what current is the cause of the discharge through R67, when motorcycle is not running. If current reaches 20 to 30 mA there is defect in regulator
10. Ohmmeter can serve for checking-up R67 if some of the entry phase conductors or + outlet on battery is not short-circuited on frame or mutually between them. In this case R67 is defected.

### Procedure when detecting defaults in ignition circuit Z67

#### A. The motorcycle cannot be started-up at all

1. Disconnect Z67 conductors under tank
2. Measure the resistance of winding of charging coils on stator by direct current ohmmeter ; furthermore to check-up whether these coils don't have the leakage on machine frame
3. Measure on yellow conductor leading from sensor S01, the correct resistance against frame,  
S01= 200 $\Omega$  (sensor placed under right engine cover)
4. Disconnect terminal board at R67 and measure by direct current whether there is not leakage of charging coils on source winding

**Note :** Both windings are to be perfectly insulated from each other. If the windings on stator and resistance S01 are O.K., stator A67 itself is O.K.,too

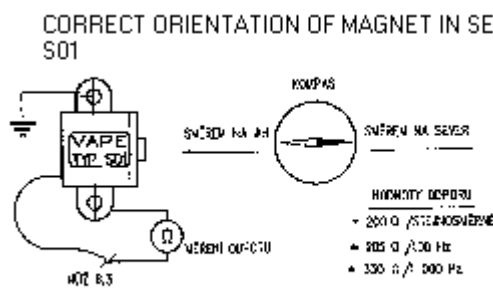
5. By ohmmeter verify resistance of yellow conductor against frame ( $120\Omega$ ) at switch Z67 ; resistance of red and white conductors and blue conductor has to be  $> 40k\Omega$  - more details in article conc. Z67
6. Measure Vn coil - resistance =  $6k\Omega \pm 10\%$
7. Verify whether blue conductor is not by coincidence constantly short-circuited on frame by fault in cabelling
8. Check-up whether frame S01 is connected to frame Z67

*Note :* Various bulges and bumps on surface of Z67 signal overheating of Z67. It's necessary to check-up cabelling and eventual short-circuit into 12V distribution circuit  
If all these values are correct and it's not still possible to start-up the motorcycle, try on removing plug if some spark even exists when starting-up

### B. There is irregular running of motorcycle or bad start-up

1. Control plugs and cables
2. Measure resistance of Vn coil at Z67
3. Verify circuit S01 ( $200\Omega$ ) and earth connection between S01 and Z67 by ohmmeter
4. Check-up ohmically the winding of charging coils on A67 including their eventual leakage on current winding for headlights
5. Measure by direct current ohmmeter whether red conductor on Z67 is not short-circuited on frame
6. Verify by compass the polarity of magnet in S01
7. Control if some of wires are not fallen out from rotor A67 . Check-up by means of auxiliary magnet changing of magnet polarity in rotor.
8. Check-up the setting up of advance

When analysing the cause we can detect the default directly in alternator A67 or in switch Z67, eventually on other place. The more detailed analysis can be effected by means of oscilloscope on testing machine.



### 5.6. Accumulator 12 V 5Ah (type 12Al)

**Description :** Accumulator is of closed construction in a container made from transparent polypropylene. The cover is equipped with 6 battery filler cap with a system of central deaeration and is made of plast . The outlets are of lead, the same execution with hole  $\varnothing 5,5$  mm. The outlets are distinguished by indication + and - on cover.

The outlet of deaeration is on the - side of outlet. On the transparent wall of accumumlator container there is a minimum and maximum level of battery acid indicated by line segments .

Accumulator is supplied in precharged condition. It fulfills Czech state norms ČSN 36 4316, ČSN 364318.and the international ones, too.



Dimensions of accumulator :

height	130 mm	
length	121 mm	
width	61 mm	
net weight of accumulator		1,7 kg
gross weight of filled in accumulator		2,07 kg

### 5.6.1. Preparing the battery for operation

#### Electrolyte filling of accumulator

Adhesive tape placed over the deaeration hole and filler caps is removed and filler caps are uncapped. It's necessary to fill each cell with electrolyte up to the level of upper mark on (cover)case. Electrolyte is formed by diluted sulphuric acid according to ČSN 65 1230norm, with density of 1,28 g/cm<sup>3</sup> and temperature of 25 C. After filling it's necessary to let accumulators plates saturate properly with electrolyte of prescribed density during 20 minutes without further charging. To check-up and eventually top up the level of electrolyte, to cap the filler caps, wash off the accumulator, dry up, put on the deaeration tube on outlet of deaeration and fix the accumulator into motorcycle. The motorcycle has to be immediately put into operation and go through riding of approx.100 kms.

#### Charging

The accumulator which is activated after 6 months period from the date of production and accumulator which is not immediately in operation after being filled with electrolyte, has to be charged. Likewise accumulator with voltage lower than 12 V and electrolyte with density lower than 1,26 g/cm<sup>3</sup> has to be charged. The accumulator is charged by current of 0,25 - 0,5 A (battery charger) with possibility of air regulation as long as the voltage and density of electrolyte are not changing any longer.

#### Note

Charging period depends on state and capacity of accumulator. During the charging it's necessary to follow temperature of accumulator which should not exceed 40 C. After exceeding the mentioned temperature the accumulator has to be cooled (e.g. by running water).

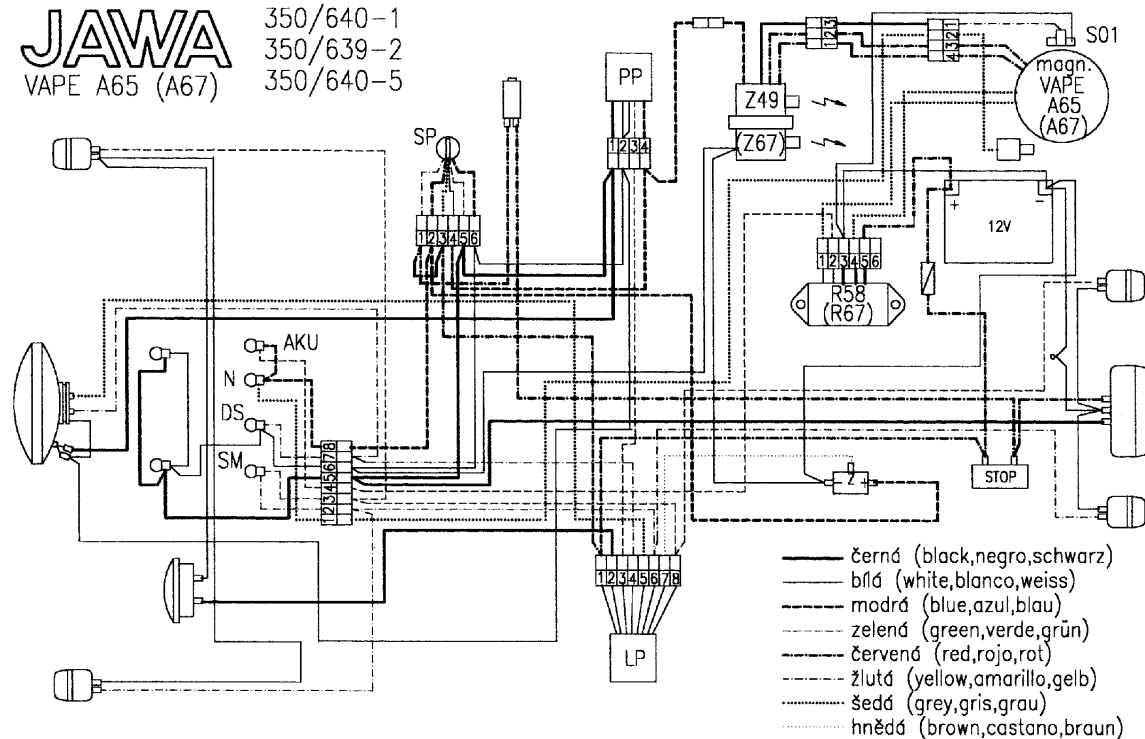
When higher density of electrolyte we keep filling up the level by distilled water, only.- The voltage of fully charged accumulator is 12,6 V, i.e. 2,1 V per cell. From the structural reason the voltage of individual cells of this type cannot be measured.

When operating the motorcycle the terminal connectors have to be permanently connected with battery when engine is running. It's not even permissible "trial" disconnecting of accumulator when engine is running ! We draw also attention to the following situation : during arc welding the terminal connectors of regulator have always to be disconnected together with terminal connectors of rectifier (eventually even earth connection eye on regulator casing).

**Electrical schema of Jawa 350**

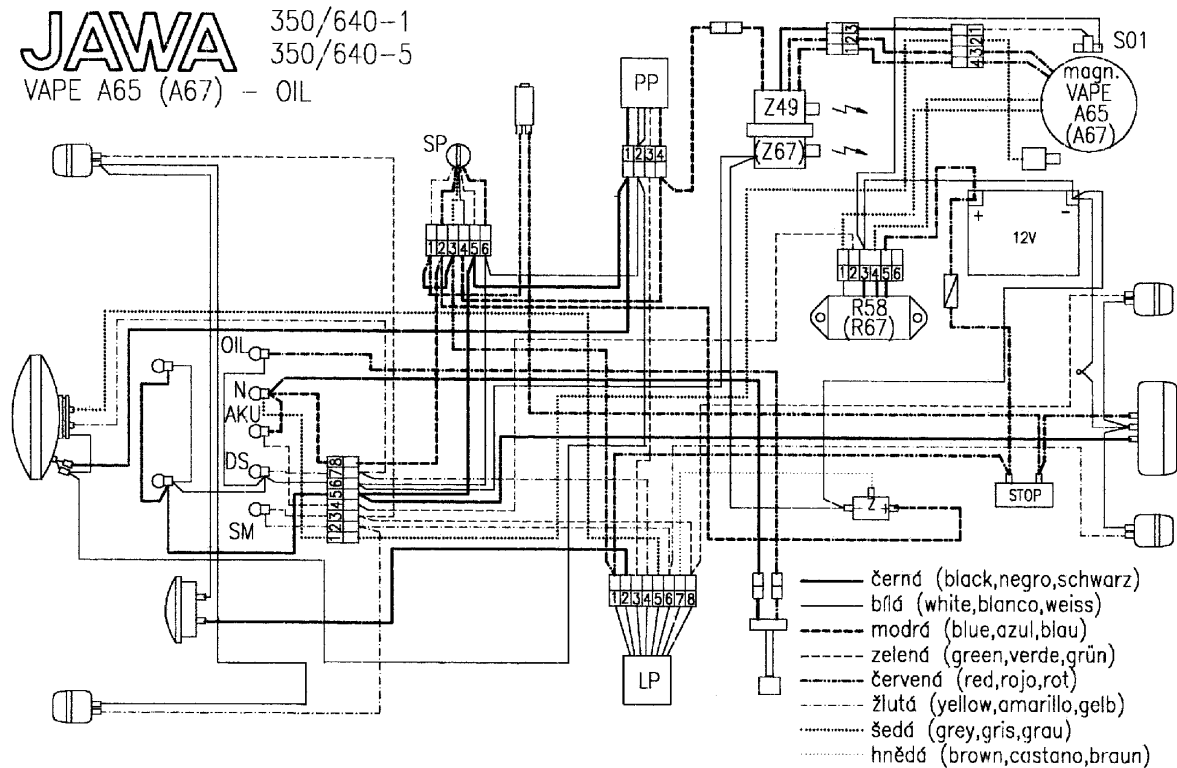
**JAWA**  
VAPE A65 (A67)

350/640-1  
350/639-2  
350/640-5



**JAWA**  
VAPE A65 (A67) - OIL

350/640-1  
350/640-5





## VI. OIL PUMP

### 6.1 Description of lubricating system

#### Oil pump

Motorcycles equipped with oil pump are from now on greased with fuel mixture but not in proportion given and mixed beforehand, which is changing subject to revolutions and to travel of slide valve and oil is taken from separate reservoir.

The used oil pump MIKUNI IM 137-22 is adjusted from producer to basic optimum supplied quantity of oil for motorcycles JAWA 350 and it cannot be replaced with any other type or execution without preceding authorization of JAWA MOTO.

The oil pump, powered directly by crankshaft, is placed in left engine cover. The admission to it can be reached when removing the cap fixed with two bolts. It is fixed to left cover with two nuts and the sealing is executed with "O" ring No. OS/16" (supplied by MIKUNI).

#### Oil tank

Oil tank made of transparent plastic material is placed in rear part of underseat space, accessible after removing of the seat. It is equipped with filler and withdrawable cap and in lower part with outlet. The oil tank has the capacity of 1,5 l. In its front part there is mark indicating minimum oil level.

#### Oil supply to pump

It is realized by elastic transparent tube. From the reason of assembly this tube is detachable above the rear engine part.

#### Oil supply to engine

Oil supply to engine from pump is also realized by elastic transparent tube of smaller profile, which is connected with check valve "Check No CV-22+/320" (MIKUNI), placed on upper part of engine suction branch. This valve prevents from spontaneous oil penetration to suction branch when engine is in rest.

#### Oil pump control

Control of oil pump segment and its synchronization with stroke of slide gate of carburettor is realized by divided bowden cable. Twist-grip is connected by one bowden with adaptor, placed on frame under fuel tank. From this adaptor the bowdens of oil pump and of slide gate of carburettor are leading.

### 6.2. Preparation of motorcycle

- a) Filling of the oil tank with oil for two stroke engines (in inland Mogul TS), incl. feeding tubes.
- b) Unstopping of feeding tube on engine and connection by means of connector with filled feeding tube from oil tank.
- c) Connection of pump bowden with left cover and its cords to operating pump segment - after removing of cover cap.
- d) Connection of bowden of carburettor with slide gate



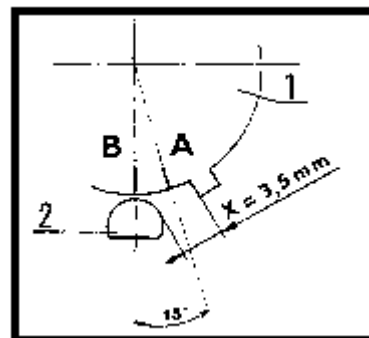
e) The basic setting of segment for engines 638 (pump type 22) is  $15^\circ$  and is executed as follows : - insert gauge 638( No.of prod.9.71.87536.4, width 3,5mm) between segment and attachment stop  
- use electric pen to mark new gauge line(B)  
(determinating basic setting of oil pump) facing gauge line on attachment

f) Adjusting of bowden of carburettor . The slide gate has to be in lowest position

g) When freewheel slide gate position is changed , it's necessary to adjust oil pump bowden following point e)

h) If air vent of oil pump occurs, release the deaeration screw on face of pump ( above regulating segment) .

After filling the pump with oil tighten the screw and with slightly increased revolutions we turn over by hand the segment into maximum position. This procedure accelerates the deaeration of piping into engine.



Attention ! The oil level has always to be checked-up after covering 500 kms.

To pic

1 – segment

A - original gauge MIKUNI

X - space for gauge

2 – attachment

B - new gauge JAWA

### 6.3. Cleaning out of the oil pipe system

In case of blocked oil pump with filth, it's necessary to proceed as follows :

1. Dismantle oil tank from rear part of underseat space of motorcycle. Pour out the oil from tank and flush the empty tank (spirit, benzine). The original outlet placed in lower part of tank replace by a new one equipped with sieve (prod.No.451964039013)
2. Flush also the feeding transparent pipe of bigger diameter and proceed following point 2b)
3. Dismantle feeding oil tube to engine from inlet suction branch valve and clean the valve with compressed air in the direction of oil flow
4. Drain fully the fuel tank and pour in 1 liter of mixture (fuel/oil) 1: 50
5. Cover in a adequate manner the inlet of securing valve, start up the engine and wait until some 50cm<sup>3</sup> of original soiled oil flows out
6. Switch off the engine, loosen securing valve and connect the whole system
7. After refilling the fuel tank and assembly of oil pump on motorcycle, we proceed following point 2a. Deaerate the oil pump according point 2h.



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## **WORKSHOP MANUAL**

### **JAWA 350/638,639,640**

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