

Engine parts

250

Technical data

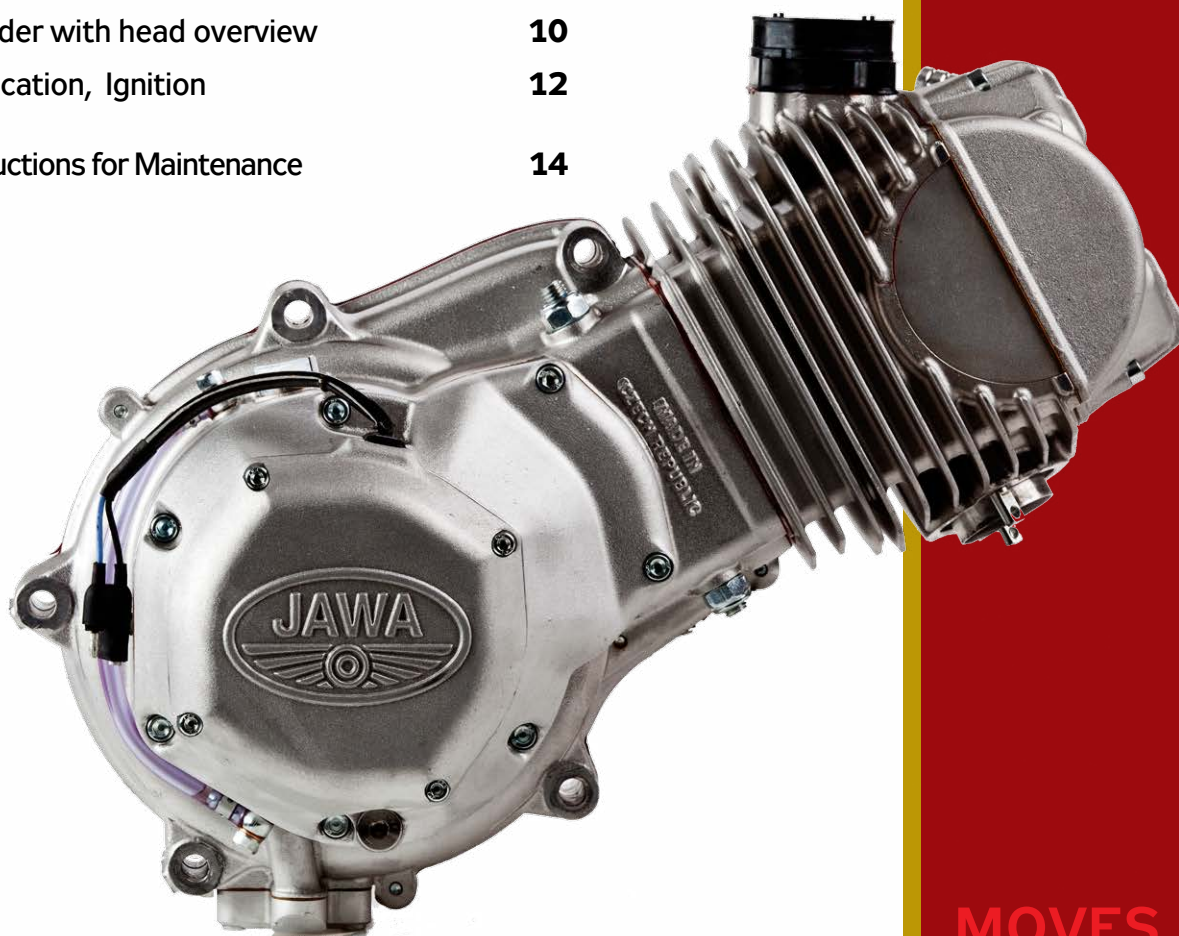
Engine type 250-10-010 offset 8

Engine type 250-10-009 offset 4

Engine type 250-10-008 normal

Engine	Air cooled, four stroke, single cylinder, 1× OHC
Bore × stroke	77,0 × 53,6 mm
Volume	249,6 ccm
Max. power	30 kW
Fuel	Methanol
Veight	28–30 kg

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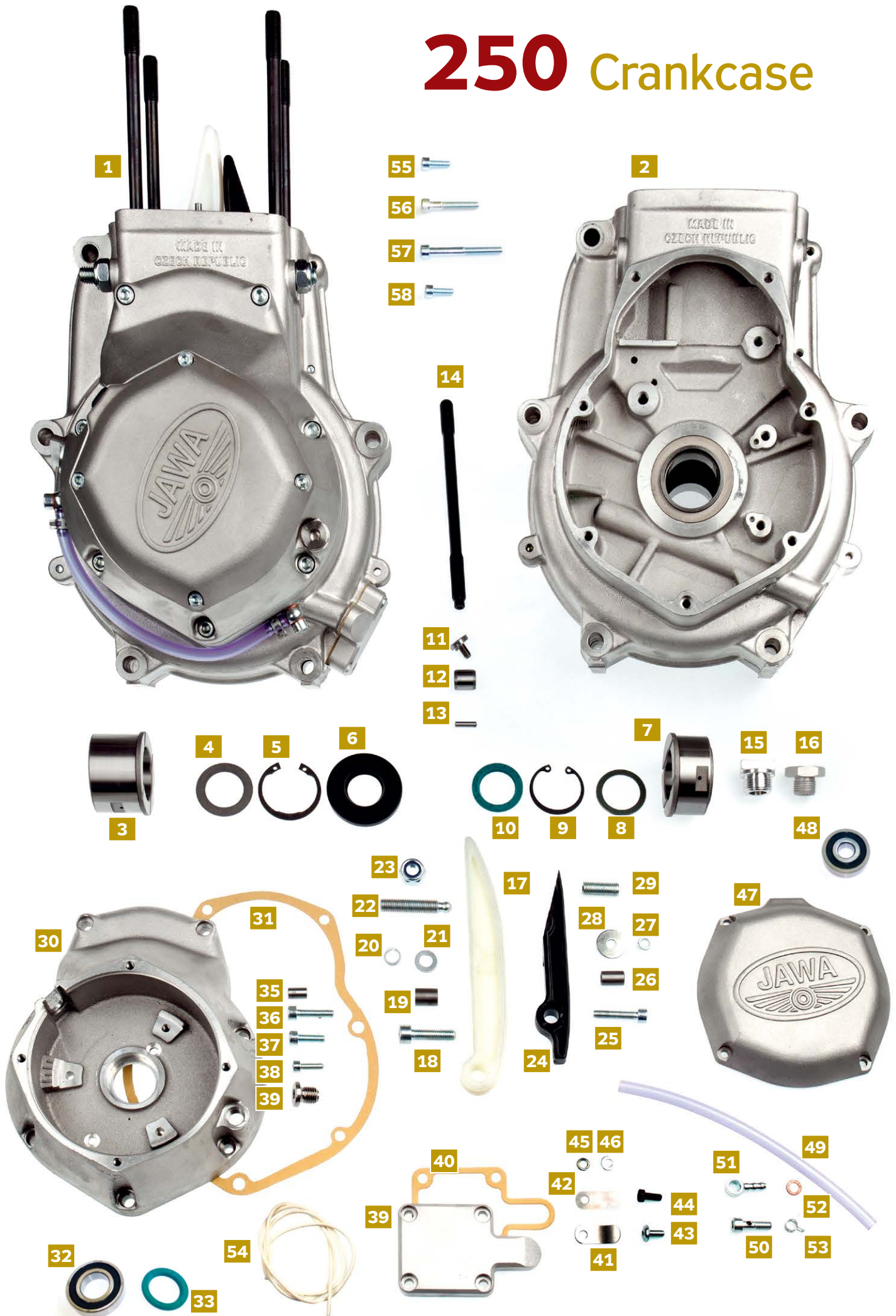
250 Exhaust and chains



1	250-01-510	1	Exhaust pipe
2	250-01-610	1	Exhaust pipe – longtrack
3	891-01-140	1	Exhaust bracket
4	250-01-011	1	Insert of exhaust pipe
5	250-01-021	1	Front holder
6	273 187 030 020	1	Silentblok 30-20-P4
7	315 196 156 415	2	Spring
8	896-01-055	1	Clamp
9	309 543 210 620	1	Screw M6×30
10	896-01-056	1	Insert
11	896-01-057	1	Insert with thread
12	893-01-032	1	Roller
13	309 074 060 008	1	Screw M6×8

250 Exhaust and chains

250 Crankcase



1	889-11-011		Crankcase complete – straight
	889-11-012		Crankcase compl. – Off set 8mm
	889-11-013		Crankcase compl. – Off set 4mm
2	889-11-610	1	Crankcase with bushes straight
	889-11-650		Crankcase-bushes – Off set 8mm
	250-11-520		Crankcase-bushes – Off set 4mm
3	875-11-056	1	Main bearing bushing left
4	897-11-057	1	Washer 20–27
5	311 733 100 400	1	Circlip 40×1,75
6	273 521 106 205	1	Shaft seal 25×52×7
7	875-11-021	1	Main bearing bushing right
8	898-11-022	1	Washer
9	311 733 100 350	1	Circlip 35×1.5
10	2738884110 25	1	Shaft seal G 25×35×4
11	875-11-057	2	Screw M6
12	875-11-058	2	Dowell pin
13	311 515 004 014	2	Pin d4x14
14	880-11-025	4	Studbolt M10×154
15	894-11-158	1	Screw M16×1,5
16	889-11-048	1	Screw M20×1,5
17	884-11-031	1	Tightener of the chain
18	309 543 210 820	1	Screw M8×30
19	884-11-032	1	Spacing tube d8,2
20	311 214 023 082	1	Spring washer d8.2
21	311 210 222 084	1	Washer d8,4
22	898-11-037	1	Screw of the tensioner
23	311 129 221 100	2	Nut M10
24	884-11-034	1	Tightener of the chain short
25	309 543 210 620	1	Screw M6×30
26	884-11-035	1	Spacing tube d6,2
27	311 214 023 061	1	Spring washer d6,1
28	311 210 222 064	1	Washer d6,4
29	309 785 010 025	1	Screw of the tensioner M10×25
30	889-11-047	1	Cover of the timing gear
31	627 889 811 024	1	Gasket of the timing gear
32	324 160 030 026	1	Ball bearing 6003
33	273 888 020 284	1	Shaft seal G 20×28×4
34	889-11-039	1	Screw with magnet
35	898-11-023	2	Dowell pin
36	309 543 210 618	4	Screw M6×25
37	309 543 210 616	9	Screw M6×20
38	309 543 210 514	4	Screw M5×16
39	889-11-613	1	lower lid
40	627 888 891 1619	1	seal
41	889-11-515	3	Stop of the plate
42	889-11-514	3	Plate
43	309 714 105 012	1	Screw M5×12
44	3097080500 12	2	Screw M5×12
45	311 214 023 051	2	Spring washer d5,1
46	311210222053	2	Washer d5.3
47	889-11-032	1	Cover of ignition
	889-11-033		Cover of ignition black (On request)
48	324 162 000 020	1	Ball bearing 6200
49	286 121 231 609	1	Oil level pipe
50	875-11-552	2	Screw of the connection
	889-11-055	2	Oil level indicator
51	875-11-553	2	Connection
52	898-11-056	4	Washer d6,2
53	311 750 076 083	2	Hose clamp
54	889-11-618	1	Sealing silicone cord
55	309 543 210 618	2	Screw M6×25
56	309 543 210 624	2	Screw M6×40
57	309 543 210 628	1	Screw M6×50
58	309 543 210 614	4	Screw M6×16

250 Crankcase

250 Crankshaft mechanism



1	250-12-510		Crankshaft mechan.
2	250-12-511	1	Flywheel right 158
3	250-12-512	1	Flywheel left 158
4	250-12-110	1	Connecting rod compl.
5	889-12-105	1	Crankshaft journal
6	324 588 912 507	1	Needle bearing 35×42×19.8
7	889-12-023	4	Spacing washer
8	886-12-106	2	Washer Cooper
9	895-12-014	1	Carrier chain conveyer
10	324 589 712 015	1	Needle bearing 25×35×30
11	324 588 412 017	1	Needle bearing 25×33×20
12	889-12-017	1	Driver of the ignition shaft
13	311 728 504 018	1	Key 4×7.5
14	889-12-018	1	Sprocket 18z
15	890-12-006	1	Nut of the journal left
16	250-12-115	1	Sprocket 15z
17	311 733 000 420	2	Circlip 42×1.75
18	885-12-014	1	Piston pin
19	451 989 012 003	3	Circlip
20	250-12-030		Piston set
21	250-12-011	1	Piston 77.0 (Cilinder nicasil)
22	326 925 012 025	1	Piston rings W3023×6
23	880-12-015	1	Chain 98 rollers
24	889-12-207	1	Bush of connecting rod

Parts on customer request

326 925 012 010

Piston set CP D77

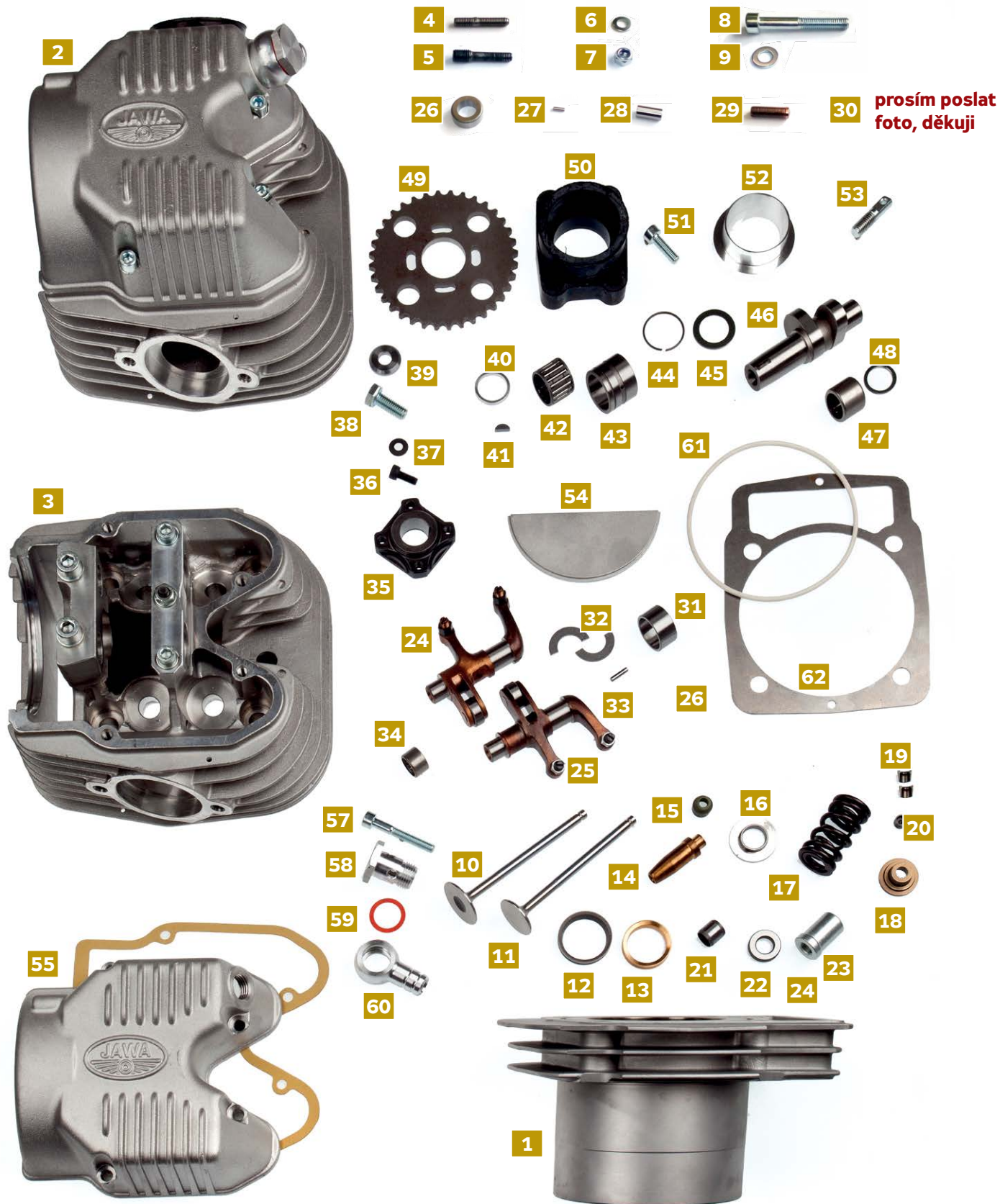
Abnormal parts

/5/	889-12-115		Cranksh.journ. abn.-on the sides +0,03
/5/	889-12-116		Cranksh.journ. abn.-In the middle +0,03
/5/	889-12-117		Cranksh.journ. abn.-whole +0,03
	889-12-118		Cranksh.journ. abn.-whole +0,06

Příbal k motoru

888-12-023 1 Sprocket 13z (Layshaft)

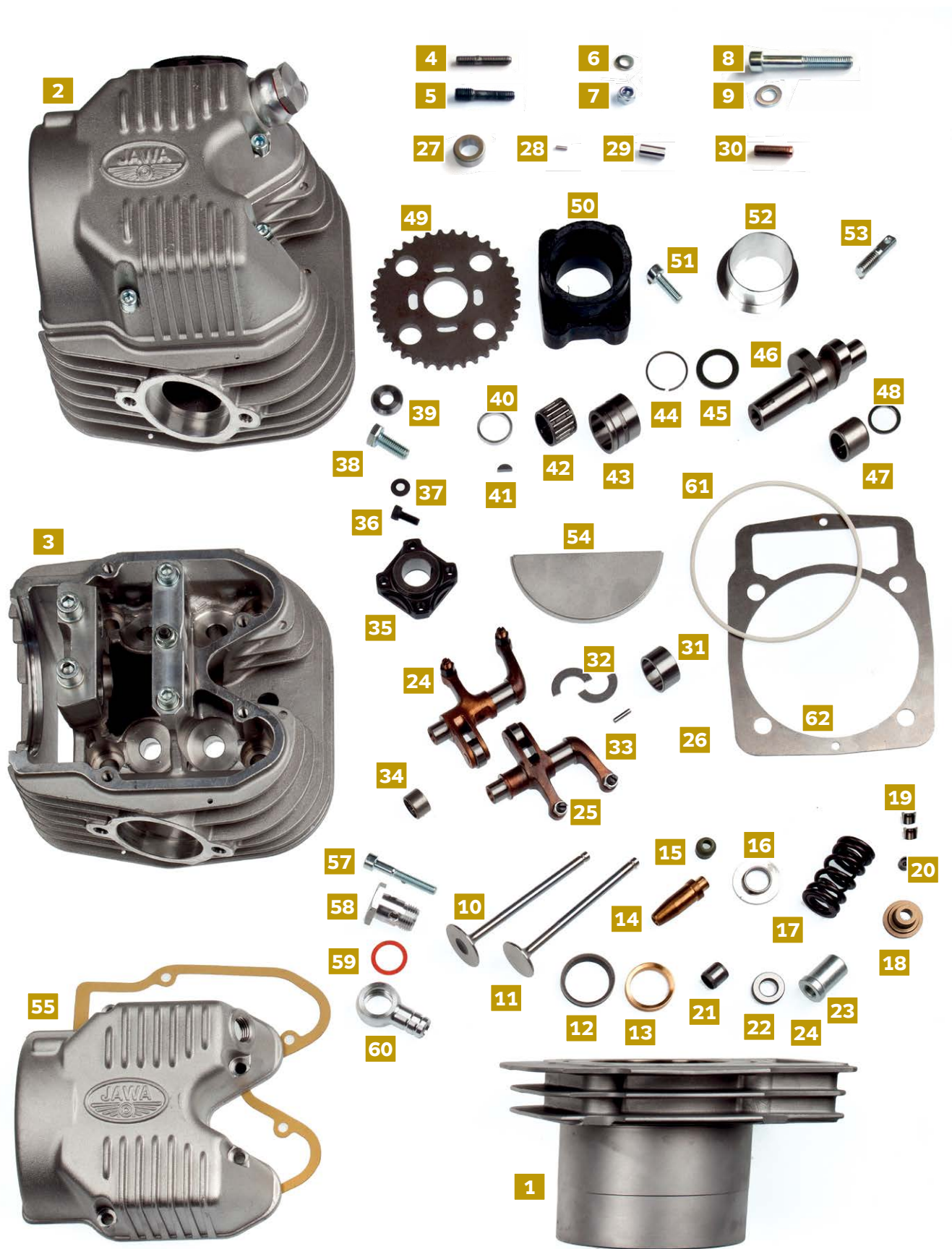
250 Cylinder with head



1	250-13-011	1	Cylinder nikasil std.
2	250-13-200	1	Head compl.
3	250-13-210	1	Head with bushes
4	889-13-117	2	Studbolt M6
5	889-13-116	2	Studbolt M6/M8
6	311 210 222 064	3	Washer d6,4
7	3111201210 60	3	Nut M6
8	309 501 000 832	2	Screw M8x60
9	311 210 320 084	2	Washer d8,4
10	250-13-225	2	Intake valve d6
11	250-13-226	2	Exhaust valve d6
12	250-13-123	2	Seat of the intake valve
13	250-13-124	2	Seat of the exhaust valve
14	250-13-222	4	Guide of the valve d6
15	273 588 413 128	4	Valve seal d6
16	250-13-289	4	Lower spring plate
17	451 925 013 287	4	Valve spring set
18	250-13-286	4	Upper spring plate
19	451 988 913 121	4	Groove collets
20	884-13-127	4	Valve cap d6
21	870-13-174	2	Dowell pin
22	889-13-169	4	Washer d10,5
23	889-13-168	4	Nut of the head
24	250-13-330	1	Rocker arm for intake compl.
	250-13-331		Rocker arm for intake
25	250-13-340	1	Rocker arm for exhaust compl.
	250-13-341		Rocker arm for exhaust
26	897-13-133	1	Roller
27	324 989 214 023	13	Needle roller
28	897-13-134	1	Pin
29	889-13-172	2	Adjusting screw
30	311 188 913 138	2	Nut M6x0,75
31	889-13-132	2	Bush d20
32	889-13-134	4	Circlip
33	324 988 913 312	36	Needle roller
34	324 588 813 145	2	Needle bearing d12 HK1210B
35	889-13-121	1	Sprocket wheel carrier
36	309 701 050 012	4	Screw M5x12
37	3112364500 56	4	Washer B5.3
38	3095032108 16	1	Screw M8x20
39	884-13-144	1	Washer d8,2
40	884-13-149	1	Ring of camshaft
41	311 728 503 009	1	Key 3x3,7
42	324 588 413 139	1	Needle bearing 18x22x17
43	894-14-023	1	Bush with slot
44	4519894140 26	1	Circlip
45	894-13-024	1	Spacing washer
46	880-13-135	1	Camshaft n.05
47	324 589 713 146	1	Needle bearing d15

250 Cylinder with head

250 Cylinder with head



48	897-13-149	1	Washer d15
49	889-13-122	1	Cam sprocket 36T
50	889-13-139	1	Intake branch gum
51	309 543 210 615	4	Screw
52	250-13-219	1	Exhaust branch
53	871-13-124	2	Holder of the exhaust valve
54	889-13-118	1	Lid
55	889-13-261	1	Cover of the head
	889-13-263		Cover of the head - black
56	627 888 913 166	1	Gasket head cover
57	309 543 210 624	4	Screw M6x40
58	898-13-166	1	Breather screw
59	722 989 813 171	3	Gasket
60	898-13-169	1	Connection
61	273 111 014 399	1	Rubber ring 99.5x3
62	624-13-405	1	Cylinder gasket th. 0.5
/62/	624-13-408		Cylinder gasket th. 0.8
/62/	624-13-410		Cylinder gasket th. 1.0
/62/	624-13-412		Cylinder gasket th. 1.2
/62/	624-13-415		Cylinder gasket th. 1.5
/62/	624-13-430		Cylinder gasket th. 3.0

Parts on customer request

/46/	451925013280		Camshaft Tornado S3
/46/	451 925 013 285		Camshaft Tornado S25.2

Abnormal parts

/12/	889-13-583		Intake valve's seat abn.
/13/	889-13-584		Exhaust valve's seat abn.
/14/	889-13-584		Guide of the valve abn.

250 Cylinder with head

250 Lubrication, Ignition



Lubrication

1	889-15-011	1	Body of the oil pump
2	889-15-013	1	Cover of oil pump
3	273 111 014 164	1	Rubber ring 36×2
4	899-22-123	1	Spacing washer
5	889-15-012	1	Wheel of oil pump
6	889-19-011	1	Shaft of the ignition
7	898-19-132	1	Nut M 12×1 left
8	311 214 023 051	2	Spring washer d5,1
9	311 210 222 053	2	Washer d5,3
10	451 988 919 043	1	Circlip d17
11	309 543 210 522	2	Screw M5×35
	309 543 210 545	1	Screw M5×45
12	309 543 210 518	1	Screw M5×25
13	309 691 205 012	6	Screw M5×12
14	889-15-022	1	Tube 23,7 mm
15	273 111 010 014	2	Rubber ring 8x4
16	273 121 995 610	1	Bushing
17	889-15-014	1	Oil filter

Ignition

18	443 221 045 010	1	Sparking plug NGK -10
19	443 288 419 016	1	Ignition coil PVL – digital
20	443 288 419 014	1	Ignition coil PVL – analog
21	443 288 419 012	1	Ignition PVL – rotor
22	443 288 419 013	1	Ignition PVL – stator
	443 288 419 010	1	Ignition PVL compl.
23	443 900 500 400	1	Cover of sparking plug PVL P18
24	443 288 919 014	1	Ignition coil SELETTRA – analog
25	443 288 919 016	1	Ignition coil SELETTRA – digital
26	443 288 919 012	1	Ignition SELETTRA – rotor
27	443 288 919 013	1	Ignition SELETTRA – stator
	443 288 919 030	1	Ignition SELETTRA compl. Analog
28	443 900 602 140	1	Spring of the spark plug Selettra
29	443 900 500 400	1	Cover spark plug Selettra
30	889-19-010	1	Ignition switch
31	893-19-010	1	Earth cable compl.
/18/	443 221 045 011	1	Sparking plug NGK RO 16-11
/18/	443 221 045 012	1	Sparking plug NGK RO 373-10
/18/	443 221 045 013	1	Sparking plug NGK RO 373A 11

250 Instructions

Instructions for Maintenance of Speedway Engine JRM 250-10-008

The speedway engine JAWA type 889-10-009 are intended for speedway, long and grass track racing events. The tuning of our engines for higher engine speed is to the detriment of their service life.

Description of engine JAWA type 250-10-008

The air-cooled single-cylinder, four valve OHC, stroke volume 249 ccm, the bore 77.00mm and stroke 53.60 mm. The crankcase, cylinder head and cylinder are made of Aluminium alloy. Cylinder has nicasil only. We not supply the overbore cylinders.

The crankshaft and connecting rod big-end have cage-type needle bearings. The chain driven camshaft is supported in the cylinder head on needle bearings. The valves operated by rocker arm are at an angle 35°. The valve seats are hot-pressed into the cylinder head.

The pistons is a light alloy forging and carries two piston rings, first 1mm compression ring and second 2 mm oil control ring. The circulation-system of lubrication is used. The oil tank is situated in the space between the valve gear cover and R.H. of the crankcase, the oil filling is 0.85 l for new engine and 0.75 l is refill between heats. The level can be checked by the oil level indicator.

The engine is intended for the carburettor of diameter 34 mm and provided with electronic ignition.

Bore/stroke:	77.0 × 53.6 mm
Capacity:	249.6 ccm
Maximum power output:	31–33 kW at 9800–10200rpm
Compression ratio:	13:1 – 14:1
Ignition:	electronic Selettra / PVL
Ignition Advance:	32° (adjustable 25° –35° BTDC)
Sparking plug:	NGK ROO45G - 10
Fuel:	metanol
Oil 0,85 l	Castrol R SAE 40, (Silkolene Castorene R50S)

Measured at valve lift of 1 mm and at valve clearances inlet 0,1 mm/ exhaust 0,15 mm (cold engine).

Valve timing– camshaft No.:	05
Exhaust open/close	59°/24°
Inlet open/close	26°/57°

Instructions for engine operation

Before putting an engine operation and before each race are to be checked:

- _ valve clearance adjustment
- _ chain tension and tightening of screw on cam sprocket (in case of great chain clearance the valve timing is to be checked)
- _ oil filling

Using of adequate thermal values of sparking plugs:

colder: Champion G 55R, NGK RO 16 -11 or RO045G-11

warmer: Champion G 57R, NGK RO 16 -10 or RO045G-10

On the bike must be check:

- _ tension of primary and secondary chain
- _ clutch adjustment
- _ working order of ignition cut- out
- _ working order of carburettor (free motion of slide valve)

Before using the engine at full throttle, the warming up the engine is necessary. The choke may be used only for a very short time. Starting is accomplished by pushing or rear wheel rotating. At cold engine the choke is pulled out and starting without throttle follows. The starting is made easier by "winding-up" the engine first, i.e. slight turning of the rear wheel against the direction of turning until turning resistance appears. Then the usual starting follows.

Setting-up of ignition advance

The full engine power output depends on a suitable adjustment of advanced ignition. The advanced ignition of the engine occurs before the top dead center according to the table of technical data.

The screw of checking hole the L.H. crankcase will be loosed, the crankshaft moved round a slight amount to the advanced ignition mark in order to place it into the hole center. After releasing of screws turn slightly a stator in order to make the checking line of the stator aligned with that of rotor. Then tighten the screw of stator. The engine can run in 25°- 35° ignition advance, so adjusting the engine characteristic according the condition of track is possible.

Lubrication of engine

The circulation-system lubrication is used. Oil is sucked through rough filter into pump and squeeze into crankshaft (connecting rod big-end bearing lubrication). The rough oil filter must be checked after first running of new engine, and often clearing of this filter is recommended to avoid engine seizing. From crankshaft space is oil returned to oil tank through reed valve. Oil filling is recommended to be replaced after five or six heats.

Dismantling, assembly, adjustment and service life of engine

CYLINDER HEAD AND CYLINDER

In this engine are installed double helicon springs with contact design. Therefore is not allowed to mix springs from different production runs - always the same color marks must be used together. Also only both spring together are supplied under Part No. 451 925 013 287 - like valve spring set. All data below is valid only for this springs. The installed length is 33,5mm (outer spring) for 10.5 mm valve lift (camshaft No. 05). Minimum thrust of valve springs when assembled has to be 340N - than in the full lift spring has about 950N - this thrust ensure maximum engine speed 12 000 rpm.

250 Instructions

- _ Width of intake seats 1,0–1,2 mm, round off the edges of valves and seats in the head.
- _ Rocker Arm roller must run freely without grabbing
- _ Axial clearance of camshaft 0,2–0,4 mm
- _ Replace the valve upper plates approximately after 30 races
- _ Replace the camshaft drive chain approximately after 25 races
- _ Combustion pressure in sealet by silicin "O" ring
- _ Place replace the O ring during every engine overhaul.
- _ Compression ratio is adjustment by steel plates of different thickness under cylinder.

CRANK MECHANISM

Repair works of crank mechanism are recommended to be made in specialized repair shops. The crank mechan. is pressed on cylindrical surfaces. Before pressing the interference size of pressed diameters has to be checked. The interference of crank pin at 0,13 /0,15 mm. The crank mechanism can be pressed three times without using abnormal parts. The crank pin can be ordered in an abnormal modification with greater pin diameter for pressing 0,03 mm. Axial clearance of crank mechanism in crankcase is 0,5–0,7 mm.

Axial clearance of connecting rod in assembled crank mechanism should be 0,4–0,6 mm.

The balancing of crank mechanism for horizontal engine has to be 52% of balancing masses.

Clearance of gudgeon pin in piston must be 0,007–0,17 mm.

Clearance in piston ring lock 0,35–0,38 mm. The standard piston is 250-12-011. Only this piston is recommended for use in our engine. Piston carry two piston rings, top compression ring and second oil control rings. The very first break in must be done carefully

as the oil control rings lower the amount of oil on the cylinders wall.

For safety reasons replace the big end connecting rod bearing and piston after 15 races.

During this the checking of connecting rod dimensions is recommended, the big end diameter should be 42,00/ 42,008 mm (min/ max), the radial clearance between crank pin and big end should be 0,04 / 0,052. The clearance between piston pin and small end should be for connecting rod 250-12-110: 0,02–0,03.

ASSEMBLY OF CRANK MECHANISM.

Before assembly all parts must be cleaned. The crank pin must be oriented according the oil hole in right flywheel. During pressing the holes (pins) should be slightly oiled to prevent pressed surfaces from seizing. After pressing balancing is necessary. Measurements are made in points and the run-out is measured 5 mm from flywheel faces and it should not exceed 0,03 mm. The highest value of run-out must be at the end of crank pin.

The shaft of ignition rotor is carried separately in two bearings and is connected with the crankshaft by a clutch. When dismantling the ignition the proper throwing of the shaft in the small valve gear during the reassembly must be observed.

VALVE GEAR MECHANISM

The camshaft is driven by chain directly from the crankshaft. The timing of valves is very easy, first by means of chain on cam sprocket and them final timing by means of oval holes on cam sprocket. The tightening of 4screws on the sprocket must not be neglected. The values of cam timing are indicated in technical data.