

# Technical Data, Measures and Adjusting Values

Measures in mm

Job No.

01-0

## Measures for re-machining cylinder head, general

Model	636	621	
Total height of cylinder head, new	105.8–106.0	84.8–85.0	
Minimum height of re-machined cylinder head	104.8	84.0	
Permiss. stock removal at	separating surface of cylinder crankcase	0.7	0.5
	separating surface cylinder head cover	0.3	0.3
Permissible roughness	in longitudinal direction	0.1	
	in cross direction	0.01	
Permissible deviation of parallelism of the upper separating surface with respect to the lower one, in longitudinal direction		0.1	
Distance between the front face of the pre-chamber and the separating surface of the cylinder head		–	5.5–5.9
Total compression space with mounted cylinder head		23.9–25.0	23.1–24.3
Compression space in the pre-chamber alone, in cm³		10.9–11.5	9.0–9.5
Pressure testing pressure with air, below water of 70° C		4.5–5	
<p><b>Note:</b> When re-machining the cylinder head separating surface, also re-machine the valve seats to such an extent that the permissible distance between valve head and cylinder head separating surface is guaranteed (see valve seat machining, Job No. 01–8).</p> <p>With the OM 621, also see to it that there exists the specified distance between the front surface of the pre-chamber and the cylinder head separating surface by inserting thicker gaskets between prechamber and cylinder head (see Job No. 01–1).</p> <p><b>For tightening torques, refer to Job No. 00–1.</b></p>			

## Cylinder head valve seat re-machining

Model					OM 636		OM 621	
Valve seat angle in cylinder head					90° minus 30'			
Valve seat width for intake and exhaust					1.25 to 1.75			
Permiss. out-of-true of valve seat in cylinder head					0.05			
Permiss. distance between valve head and cyl. head separating surface	OM 636				OM 621			
	new seats		remachined seats		new seats		remachined seats	
	int.	exh.	int.	exh.	int.	exh.	int.	exh.
Minimum distance with new valves	0.6	0.8	1.1	1.3	0.5	0.5	0.9	0.9
Max. distance with reground valves	0.9	1.1	1.4	1.6	0.8	0.9	0.9	0.9
Model					OM 636		OM 621	
Recess of valve seats (minimum)					0.1			
Angle of recess for			intake		90°		90°	
			exhaust		90°		75°	
Depth of recess for			intake		2.5–2.6		2.1	
			exhaust		2.5–2.6		2.6	
Outer dia. of recess for			intake		38.0		42.2	
			exhaust		33.5		38.0	
Basic dia. of recess for			intake		33.0		38.0	
			exhaust		30.0–30.3		34.0	
<b>Note:</b> The lower seat edge on the valve must not contact the valve seat in the cylinder head, because otherwise the edge then penetrates into the seat, rendering the valve untight and making it prone to burning through. Therefore, correct the valve seat at this spot so that the lower edge of the valve is free.								

# Cylinder head valve seat rings

Change: x

Valve seat rings		for Inlet			for Exhaust		
		OM 636 <sup>1)</sup>	190 D, 190 Db	x 180 Dc 190 Dc L and O 319 D	OM 636 <sup>1)</sup>	190 D 190 Db <sup>3)</sup>	x 180 Dc 190 Db <sup>4)</sup> L a. O 319 Dc
Part No.	Standard size	636 053 02 31	—	621 053 02 31	636 053 02 32	621 053 04 32	621 053 06 32
	Repair size I	—	621 053 02 31	621 053 03 31	—	621 053 05 32	621 053 07 32
	Repair size II	—	621 053 03 31	621 053 03 31	—	621 053 05 32	621 053 07 32
O. D. of valve seat ring	Standard size	$\frac{33.140}{33.130}$	—	$\frac{38.085}{38.075}$	$\frac{30.140}{30.130}$	$\frac{34.085}{34.075}$	$\frac{35.545}{35.535}$
	Repair size I	—	$\frac{38.085}{38.075}$	$\frac{38.585}{38.075}$	—	$\frac{36.000^2)}{34.585}$ $\frac{34.575}{34.575}$	$\frac{37.000^2)}{36.045}$ $\frac{36.035}{36.035}$
	Repair size II	—	$\frac{40.000^2)}{38.585}$ $\frac{38.575}{38.575}$	$\frac{39.085}{39.075}$	—	$\frac{36.000^2)}{35.085}$ $\frac{35.075}{35.075}$	$\frac{37.000^2)}{36.545}$ $\frac{36.535}{36.535}$
Bore dia. in cyl. head	Standard size	$\frac{33.000}{33.016}$	—	$\frac{38.000}{38.016}$	$\frac{30.000}{30.013}$	$\frac{34.000}{34.016}$	$\frac{35.500}{35.516}$
	Repair size I	—	$\frac{38.000}{38.016}$	$\frac{38.500}{38.516}$	—	$\frac{34.500}{34.516}$	$\frac{36.000}{36.016}$
	Repair size II	—	$\frac{38.500}{38.516}$	$\frac{39.000}{39.016}$	—	$\frac{35.000}{35.016}$	$\frac{36.500}{36.516}$
Overlap of valve seat in cyl. head	Standard size	$\frac{0.114}{0.140}$	—		$\frac{0.117}{0.140}$		
	Repair size I	—		$\frac{0.059}{0.085}$	—	$\frac{0.059}{0.085}$	$\frac{0.019}{0.045}$
	Repair size II	—			—		
Height of valve seat ring	Standard size	$\frac{8.000}{7.910}$	—	$\frac{8.000}{7.910}$	$\frac{8.000}{7.910}$	$\frac{8.000}{7.910}$	$\frac{8.000}{7.910}$
	Repair size I	—	$\frac{8.000}{7.910}$	$\frac{8.500^2)}{8.200}$ $\frac{8.110}{8.110}$	—	$\frac{8.500^2)}{8.200}$ $\frac{8.110}{8.110}$	$\frac{8.500^2)}{8.200}$ $\frac{8.110}{8.110}$
	Repair size II	—	$\frac{8.500^2)}{8.200}$ $\frac{8.110}{8.110}$	$\frac{8.500^2)}{8.400}$ $\frac{8.310}{8.310}$	—	$\frac{8.500^2)}{8.400}$ $\frac{8.310}{8.310}$	$\frac{8.500^2)}{8.400}$ $\frac{8.310}{8.310}$
Depth of bore in cyl. head	Standard size	$\frac{10.5}{10.6}$	—	$\frac{10.10}{10.20}$	$\frac{10.5}{10.6}$	$\frac{10.60}{10.70}$	$\frac{10.60}{10.70}$
	Repair size I	—	$\frac{10.10}{10.20}$	$\frac{10.30}{10.40}$	—	$\frac{10.80}{10.90}$	$\frac{10.80}{10.90}$
	Repair size II	—	$\frac{10.30}{10.40}$		—	$\frac{11.00}{11.10}$	$\frac{11.00}{11.10}$

<sup>1)</sup> Applicable only for light metal cylinder head on type OM 636. With the light metal cylinder head, do not fail to caulk the valve seat ring thoroughly at three spots.

<sup>2)</sup> Rough finishing measure.

<sup>3)</sup> Only up to engine No. 621.910-10-053 124

<sup>4)</sup> As from engine No. 621.910-10-053 125

## Cylinder head valve guides

Standard size and repair size	Colour identification	Valve guide				Bore in cyl. head inlet and exhaust	Overlap of valve guide in grey cast cyl. head	Overlap of valve guide in light metal cyl. head	
		O. D. for grey cast cyl. head (inlet and exhaust)	O. D. for light metal cyl. head (inlet and exhaust)	I. D. (inlet and exhaust)	Length InletExhaust				
Standard size OM 636	colourless	$\frac{14.039}{14.028}$	$\frac{14.039}{14.028}$	$\frac{9.000}{9.015}$	68	63	$\frac{14.000}{14.018}$	0.010 to 0.039	0.010 to 0.039
Intermediate size OM 636	grey	$\frac{14.069}{14.058}$	$\frac{14.069}{14.058}$				$\frac{14.030}{14.048}$		
Repair size I OM 636	red	$\frac{14.236}{14.228}$	$\frac{14.239}{14.228}$				$\frac{14.200}{14.218}$		
Standard size OM 621	colourless	$\frac{14.039}{14.028}$	—	$\frac{10.000}{10.015}$	61	x 49.5 <sup>1)</sup>	$\frac{14.000}{14.018}$	0.010 to 0.039	—
Repair size I OM 621	red	$\frac{14.239}{14.228}$	—				$\frac{14.200}{14.218}$		

<sup>1)</sup> On models 190 D and 190 Db the length of the exhaust valve guide is 62 mm.

On OM 636 the permissible clearance between valve stem and bore amounts to 0.030 to 0.065 mm for inlet and 0.040 to 0.065 mm for exhaust.

On OM 621 the permissible clearance between valve stem and bore amounts to 0.060 to 0.097 mm for inlet and 0.080 to 0.113 mm for exhaust.

## Pressing-in Depth of Valve Guides x

Model	Dimension from Parting Line of Cylinder Head to the front face of Valve Guide	
	Inlet	Exhaust
OM 636	25.5–26.5	30.5–31.5
	(see Fig. 01–6/1)	
190 D 190 Db	<sup>2)</sup>	31.5–32.5
180 Dc 190 Dc L and O 319 D	31.5–32.5	43.0–44.0
	(see Fig. 01–6/6)	

<sup>2)</sup> The pressing-in depth of the inlet valve guides for models 190 D, 190 Db results from the locking ring used, see Figure 01–5/4.

The same applies to OM 636 with light metal cylinder head, see Fig. 01–6/1.

## Machining Measures for Cylinder Crankcase, General

Model	OM 636	OM 621
Total height (finished)	288.9–289.1	238.4–238.5
Permissible stock removal	0.2	0.3
Permissible roughness:	in longitudinal direction	0.05
	in crosswise direction	0
Permissible deviation of parallelism of upper parting line with respect to lower parting line, in longitudinal direction	0.1	0.1
Pressure testing pressure with air, below water of 70 °C	3 atm.	3 atm.

**Note:** OM 636: the piston in TDC position must not be above or below the separating line by more than 0.3 mm; OM 621: piston may be 0.7 to 1.2 mm above the separating line; this value should be identical with all 4 cylinders.

## Cylinder crankcase machining measures of the cylinder bores

Type	Standard size	Intermediate size	Repair size I	Repair size II	Repair size III	Repair size IV
636.915	$\frac{73.500}{73.519}$	—	$\frac{74.000}{74.019}$	$\frac{74.500}{74.519}$	$\frac{75.000}{75.019}$	$\frac{75.500}{75.519}$
All other types of the OM 636	$\frac{75.000}{75.019}$	—	$\frac{75.500}{75.519}$	$\frac{76.000}{76.019}$	$\frac{76.500}{76.519}$	$\frac{77.000}{77.019}$
621.910 (OM 621)	$\frac{85.000}{85.022}$	$\frac{85.250}{85.272}$	$\frac{85.500}{85.522}$	$\frac{86.000}{86.022}$	$\frac{86.500}{86.522}$	—
621.912, 913, 914 x (OM 621)	$\frac{87.000}{87.022}$	$\frac{87.250}{87.272}$	$\frac{87.500}{87.522}$	$\frac{88.000}{88.022}$	$\frac{88.500}{88.522}$	—
<b>Machining tolerances of the cylinder bores of Models OM 636 and OM 621</b>						
Permissible out-of-round of cylinder bores						0.013
Permissible taper of cylinder bores						0.013
Permissible deviation of the cylinder bores vertical to crankshaft axis with reference to cylinder height						0.05
Permissible roughness depth of cylinder bores						0.005
Permissible waviness of cylinder bores						0.0025
<b>Note:</b> Adhere to the repair sizes stated for the cylinder bores.						

## Cylinder crankcase – cylinder liners for the OM 636

O. D. of cylinder liner	78.080–78.050
Permissible out-of-round of the cyl. liners (measured at O. D.)	0.03
Permissible taper of O. D. (O. D. 78.05–78.08)	0.01
Length of cylinder liners	189±0.3
Overlap between cylinder bore and cylinder liner	0.07–0.09
Bore in cylinder crankcase = O. D. of cylinder liner minus	0.07–0.09
<b>Note:</b> For OM 621 no cylinder liners have been provided as yet.	

## Cylinder crankcase – Bore for valve tappet OM 636

Standard vision and repair sizes	Colour identification	O. D. of tappet	Tappet bore in cyl. crankcase	Clearance of tappet
Standard	none	$\frac{25.993}{25.980}$	$\frac{26.000}{26.021}$	0.007 to 0.041
Repair size I	red	$\frac{26.007}{25.994}$	$\frac{26.014}{26.035}$	
Repair size II	white	$\frac{26.021}{26.008}$	$\frac{26.028}{26.049}$	
Repair size III	yellow	$\frac{26.043}{26.030}$	$\frac{26.050}{26.071}$	

## Cylinder crankcase breather OM 621

1st version	2nd version	3rd version
<p>From cylinder head cover into throttle duct via breather pipe.</p> <p><b>(For engines with wet air filter without soldered breather pipe up to engine No. 621.910-10-008333).</b></p>	<p>From cylinder head cover into wet air filter via a breather pipe.</p> <p><b>(For engines with wet air filter and soldered breather pipe as from engine No. 621.910-10-008334 up to engine No. 621.910-10-025161).</b></p>	<p>From cylinder head cover into throttle duct via a breather pipe.</p> <p><b>(For engines with oil bath air filter as from engine No. 621.910-10-017245 up to 017645 and from engine No. 621.910-10-025162 and so on).</b></p> <p>All engines of types 621.912, 913 and 914.</p>