CURSOR SERIES

Industrial application

C13

C13 ENT

This publication describes the characteristics, data and correct methods for repair operations on each component of the vehicle.

If the instructions provided are followed and the specified equipment is used, correct repair operations in the programmed time will be ensured, safeguarding against possible accidents.

Before starting to perform whatever type of repair, ensure that all accident prevention equipment is available and efficient.

All protections specified by safety regulations, i.e.: goggles, helmet, gloves, boot, etc. must be checked and worn.

All machining, lifting and conveying equipment should be inspected before use.

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C13 ENT Series

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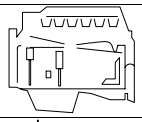
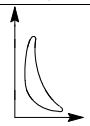
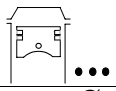
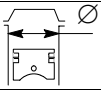
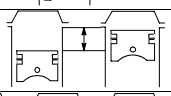
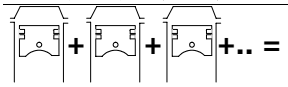
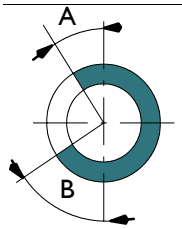
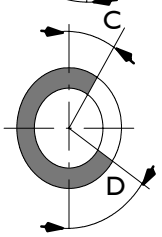
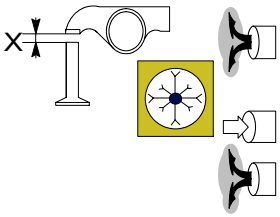
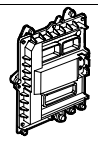
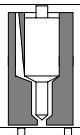
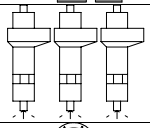
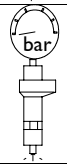
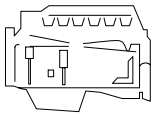
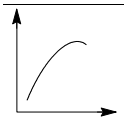
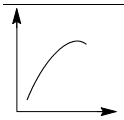
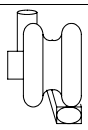
CORRESPONDENCE BETWEEN TECHNICAL CODE AND COMMERCIAL CODE

Technical Code	Commercial Code
F3BE0687A*....	C13 ENT

SPECIFICATIONS

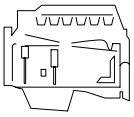
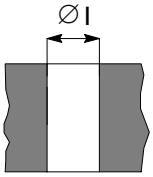
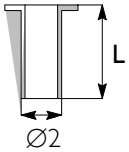
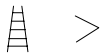
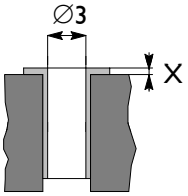
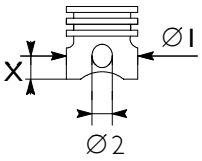
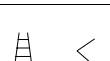
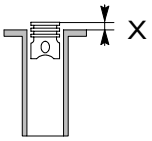
	Type		C13 ENT SERIES
	Cycle		4-stroke Diesel engine
	Fuel feed		Turbocharged
	Injection		Direct
	No. of cylinders		6 in line
	Bore	mm	135
	Stroke	mm	150
	Total displacement	cm^3	12880
	VALVE TIMING		
	opens before T.D.C.	A	17°
	closes after B.D.C.	B	30°
	opens before B.D.C.	D	50°
	closes after T.D.C.	C	9°
	For timing check		
	X	mm	-
	X	mm	-
	Running		
	X	mm	0.35 to 0.45
	X	mm	0.45 to 0.55
	FEED		Through fuel pump - filters
	Injection type: Bosch		With electronically regulated injectors PDE 31 pump injectors controlled by overhead camshaft MS6.2**DC7** ECU
	Nozzle type		–
	Injection order		1 - 4 - 2 - 6 - 3 - 5
	Injection pressure	bar	1500
	Injector calibration	bar	290 ± 12

C13 ENT Series engines			TECHNICAL CODE
	Type		F3BE0687A*....
ϱ	Compression ratio		16.5 ± 0.8
 	Max. output	kW (HP) rpm	368 (500) 1900
 	Max. torque	Nm (kgm) rpm	2250 (225) 1200
	Loadless engine idling	rpm	-
	Loadless engine peak	rpm	-
	Bore x stroke Displacement	mm cm^3	135 x 150 12880
	**SUPERCHARGING** Turbocharger type		Intercooler Direct injection HOLSET HX60W
	**LUBRICATION** Oil pressure (warm engine) - idling - peak rpm	 bar bar	Forced by gear pump, relief valve single action oil filter 4 5
	COOLING Water pump control **Thermostat** - start of opening	 °C	Liquid Through belt 80

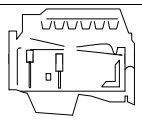
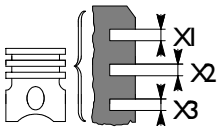
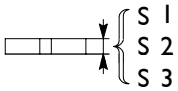
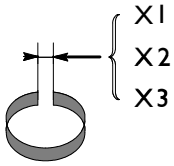
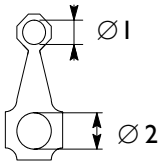
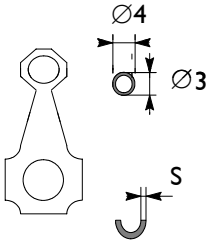
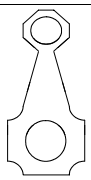
Data, features and performances are valid only if the technician fully complies with all the installation requirements provided by Iveco Motors.

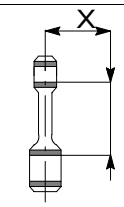
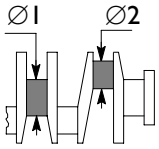
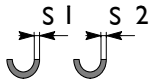
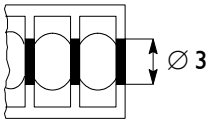
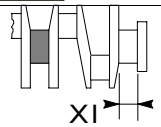
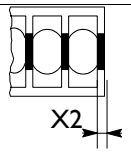
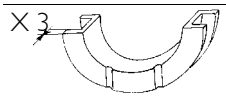
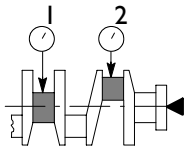
Furthermore, the use of the unit after overhaul showd conform to the original specified power and engine rev/min for which the engine has been designed.

ASSEMBLY CLEARANCE DATA

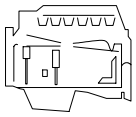
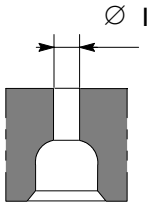
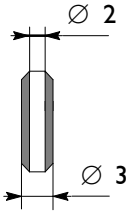
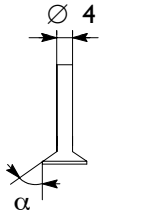
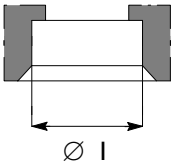
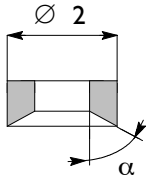
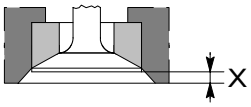
	Type		C13 ENT SERIES
CYLINDER BLOCK AND CRANKMECHANISM COMPONENTS			mm
	Bores for cylinder liners: Ø1	upper	153.500 to 153.525
		lower	152.000 to 152.025
	Cylinder liners: external diameter: Ø2	upper	153.461 to 153.486
		lower	151.890 to 151.915
	length	L	-
	Cylinder liners - crankcase bores	upper lower	0.014 to 0.039 0.085 to 0.135
IVECO PARTS 	External diameter	Ø2	-
	Cylinder sleeve inside diameter	Ø3A*	135.000 to 135.013
	inside diameter	Ø3B*	135.011 to 135.024
	Protrusion	X	0.045 to 0.075
* Selection class			
* Under a load of 800 N			
	Pistons: measuring dimension	X	20
	external diameter	Ø1A●	134.881 to 134.893
	external diameter	Ø1B●●	134.892 to 134.894
	pin bore	Ø2	54.010 to 54.018
	Piston - cylinder sleeve	A* B*	0.107 to 0.132 0.096 to 0.132
* Selection class			
IVECO PARTS 	Piston diameter	Ø1	-
	Pistons protrusion	X	0.12 to 0.42
	Gudgeon pin	Ø3	53.994 to 54.000
	Gudgeon pin - pin housing		0.010 to 0.024

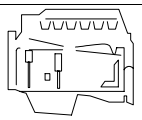
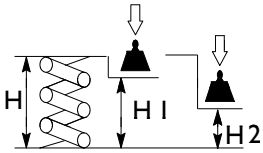
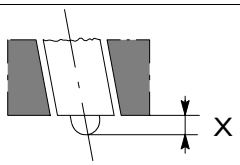
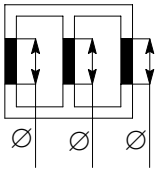
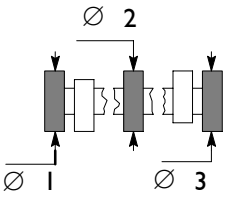
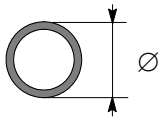
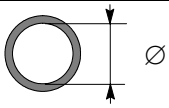
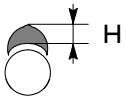
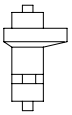
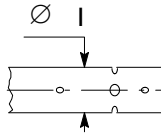
● Class A pistons supplied as spares.
●● Class B pistons are fitted in production only and are not supplied as spares.

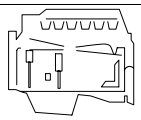
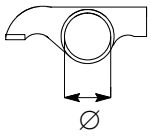
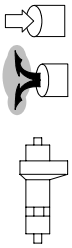
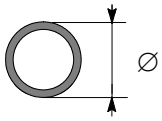
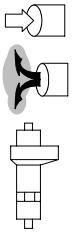
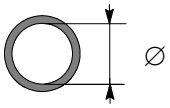
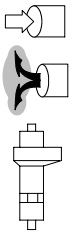
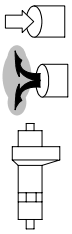
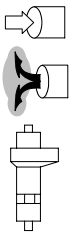
	Type		C13 ENT SERIES
CYLINDER BLOCK AND CRANKMECHANISM COMPONENTS			mm
	Piston ring grooves * measured on Ø of 130 mm	X1* X2 X3	3.445 to 3.475 3.05 to 3.07 5.02 to 5.04
	Piston rings: trapezoidal seal lune seal milled scraper ring with slits and internal spring * measured on Ø of 130 mm	S1* S2 S3	2.796 to 2.830 2.970 to 3.000 3.970 to 3.990
	Piston rings - grooves	1 2 3	0.81 to 0.179 0.060 to 0.100 0.030 to 0.070
IVECO PARTS	Piston rings		-
	Piston ring end gap in cylinder liners	X1 X2 X3	0.40 to 0.55 0.65 to 0.80 0.40 to 0.75
	Small end bush housing nominal Big end bearing housing nominal - Class - Class - Class	Ø1 Ø2 1 2 3	59.000 to 59.030 94.000 to 94.030 94.000 to 94.010 94.011 to 94.020 94.021 to 94.030
	Small end bush diameter outside inside Big end bearing shell Red Green Yellow	Ø4 Ø3 S	59.085 to 59.110 54.019 to 54.035 1.965 to 1.975 1.976 to 1.985 1.986 to 1.995
	Small end bush - housing		0.055 to 0.110
	Piston pin - bush		0.019 to 0.041
IVECO PARTS	Big end bearing		0.127 - 0.254 - 0.508
	Connecting rod weight		g.
	Class	A B C	4661 to 4694 4695 to 4728 4729 to 4762

			C13 ENT SERIES
CYLINDER BLOCK AND CRANKMECHANISM COMPONENTS			mm
	Measuring dimension	X	125
	Max. connecting rod axis misalignment tolerance	—	0.08
	Main journals - rated value - class 1 - class 2 - class 3	Ø1	 99.970 to 100.000 99.970 to 99.979 99.980 to 99.989 99.990 to 100.000
	Crankpins - rated value - class 1 - class 2 - class 3	Ø2	 89.970 to 90.000 89.970 to 89.979 89.980 to 89.989 89.990 to 90.000
	Main bearing shells Red Green Yellow*	S1	 3.110 to 3.120 3.121 to 3.130 3.131 to 3.140
	Big end bearing shells Red Green Yellow*	S2	 1.965 to 1.975 1.976 to 1.985 1.986 to 1.995
	Main bearing housings - rated value - class 1 - class 2 - class 3	Ø3	 106.300 to 106.330 106.300 to 106.309 106.310 to 106.319 106.320 to 106.330
	Bearing shells - main journals		0.060 to 0.100
	Bearing shells - big ends		0.050 to 0.090
	Main bearing shells		0.127 - 2.254 - 0.508
	Big end bearing shells		0.127 - 2.254 - 0.508
	Main journal, thrust bearing	X1	47.95 to 48.00
	Main bearing housing, thrust bearing	X2	40.94 to 40.99
	Thrust washer halves	X3	3.38 to 3.43
	Crankshaft end float		0.10 to 0.30
	Alignment Ovalization Taper	— ⬭ ⟋	1 - 2 1 - 2 1 - 2	≤ 0.025 0.010 0.010

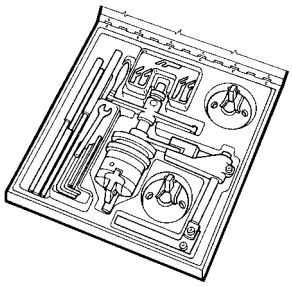
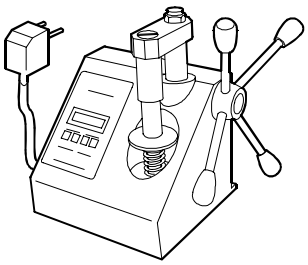
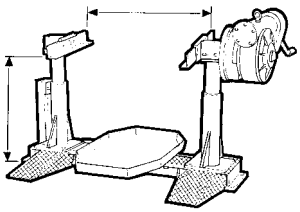
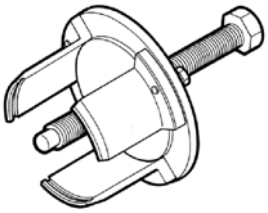
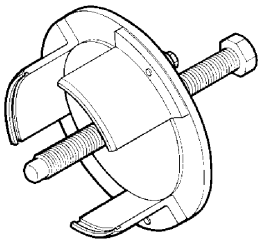
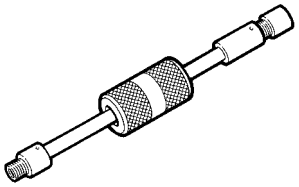
* Fitted in production only and not supplied as spares

	Type	C13 ENT SERIES
CYLINDER HEAD - VALVE TRAIN		mm
	Valve guide housings in cylinder head Ø1	15.980 to 15.997
	Valve guide Ø2 Ø3	10.015 to 10.030 16.012 to 16.025
	Valve guides - housings in the cylinder heads	0.015 to 0.045
	Valve guide	-
	Valves: Ø4 α Ø4 α	9.960 to 9.975 60° 30′ ± 7′ 30″ 9.960 to 9.975 45° 30′ ± 7′ 30″
	Valve stem and its guide	0.040 to 0.070
	Valve seat in head Ø1 Ø1	49.185 to 49.220 46.985 to 47.020
	Outside diameter of valve seat; angle of valve seat in cylinder head: Ø2 α Ø2 α	49.260 to 49.275 60° - 30′ 47.060 to 47.075 45° - 30′
	Recessing of valve	0.54 to 0.85 1.75 to 2.05
	Between valve seat and head	0.040 to 0.090

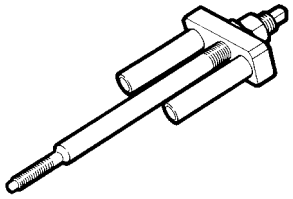
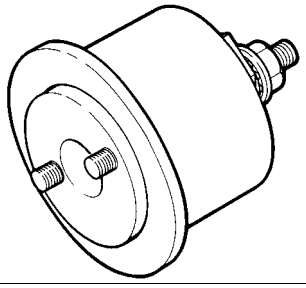
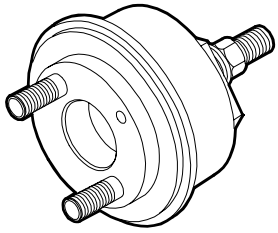
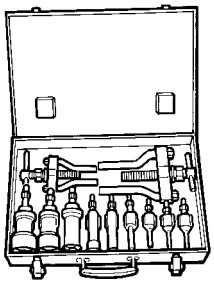
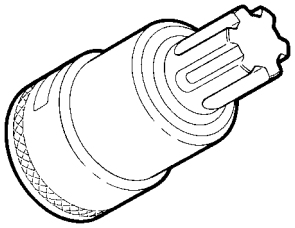
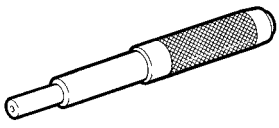
	Type		C13 ENT SERIES
CYLINDER HEAD - VALVE TRAIN			mm
	Valve spring height: free height under a load of: 575 ± 28 N 1095 ± 54 N	 H H1 H2	 72,40 58 45
	Injector protrusion	X	0.53 to 1.34
	Camshaft bushing housing in the cylinder head: 1 ⇒ 7	Ø	88.000 to 88.030
	Camshaft bearing journals: 1 ⇒ 7	Ø	82.950 to 82.968
	Outer diameter of camshaft bushings:	Ø	88.153 to 88.183
	Inner diameter of camshaft bushings:	Ø	83.018 to 83.085
	Bushings and housings in the cylinder head		0.123 to 0.183
	Bushings and bearing journals		0.050 to 0.135
	Cam lift:   		9.30 9.30 11.216
	Rocker shaft	Ø1	41.984 to 42.000

	Type	C13 ENT SERIES
CYLINDER HEAD - VALVE TRAIN		mm
	Bushing housing in rocker arms 	45.000 to 45.016 59.000 to 59.019 46.000 to 46.016
	Bushing outer diameter for rocker arms 	45.090 to 45.130 59.100 to 59.140 46.066 to 46.091
	Bushing inner diameter for rocker arms 	42.025 to 42.041 56.030 to 56.049 42.015 to 42.071
	Between bushings and housings 	0.074 to 0.130 0.081 to 0.140 0.050 to 0.091
	Between bushings of rocker arms and shaft 	0.025 to 0.057 0.025 to 0.057 0.015 to 0.087
TURBOCHARGER		
Type		HOLSET HX60W
End float		-
Radial play		-

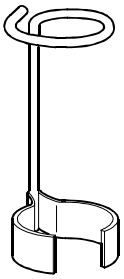
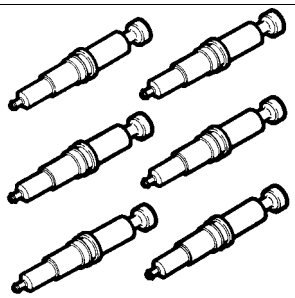
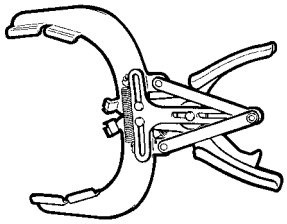
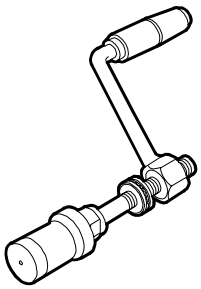
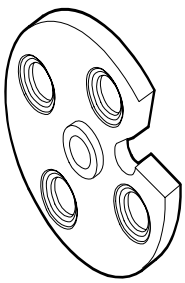
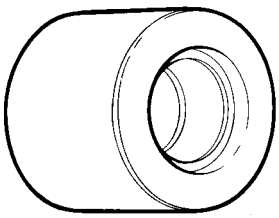
TOOLS

TOOL NO.		DESCRIPTION
99305019		Full-optional tool-kit to rectify valve seat
99305047		Spring load tester
99322230		Rotary telescopic stand (range 2000 daN, torque 375 daNm)
99340053		Extractor for crankshaft front gasket
99340054		Extractor for crankshaft rear gasket
99340205		Percussion extractor

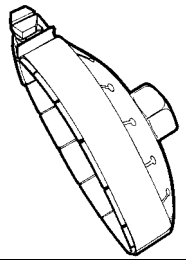
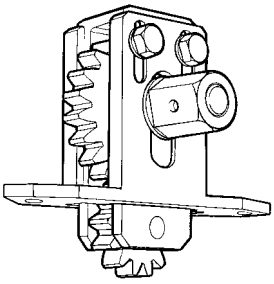
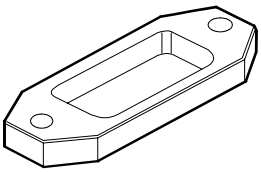
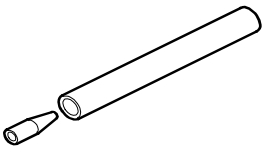
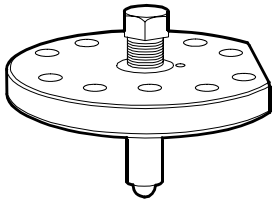
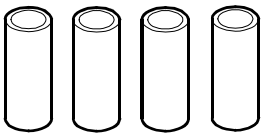
TOOLS

TOOL NO.		DESCRIPTION
99342149		Extractor for injector-holder
99346250		Tool to install the crankshaft front gasket
99346251		Tool to install the crankshaft rear gasket
99348004		Universal extractor for 5 to 70 mm internal components
99350072		Box wrench for block junction bolts to the underblock
99360143		Box wrench for block junction bolts to the underblock

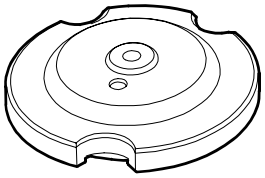
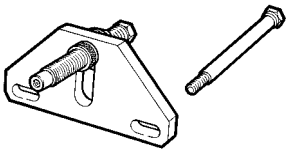
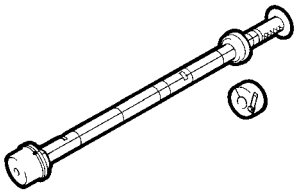
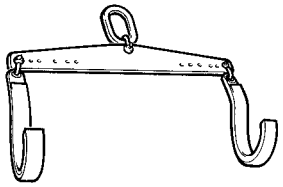
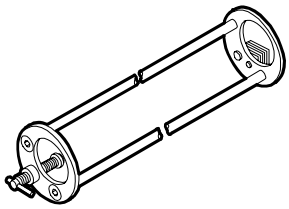
TOOLS

TOOL NO.		DESCRIPTION
99360144		Tools (12 + 6) holding rocker adjustment screw blocks when removing/refitting the rocker shaft
99360180		Injector housing protecting plugs (6)
99360184		Pliers for assembling and disassembling piston split rings (105-106 mm)
99360261		Tool to take down-fit engine valves (to be used with special plates)
99360262		Plate for take down-fit engine valves (to be used with 99360261)
99360296		Tool to fit back valve guide (to be used with 99360481)

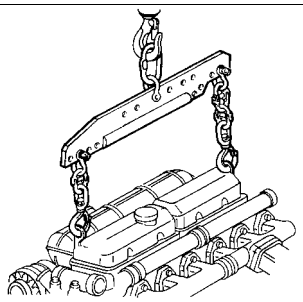
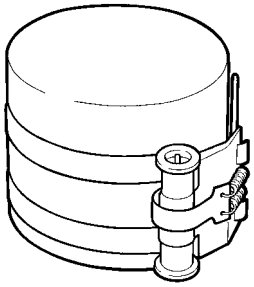
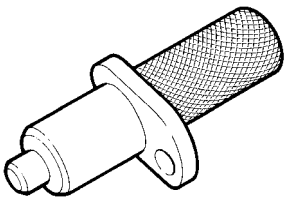
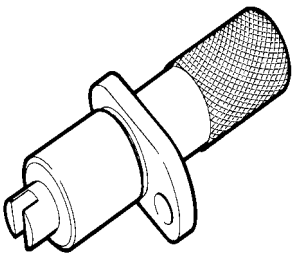
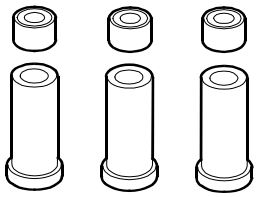
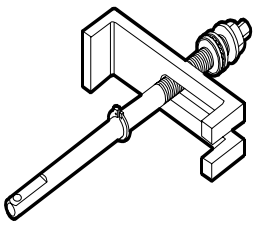
TOOLS

TOOL NO.		DESCRIPTION
99360314		Tool to remove oil filter (engine)
99360321		Tool to rotate engine flywheel (to be used with 99360325)
99360325		Spacer (to be used with 99360321)
99360329		Tool to install gasket on valve guide
99360334		Compression tool for checking the protrusion of cylinder liners (to be used with 99370415-99395603 and special plates)
99360336		Spacer (to be used with 99360334)

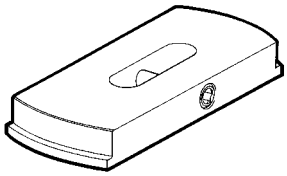
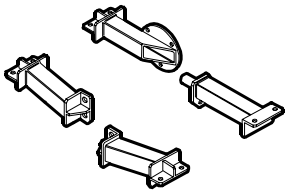
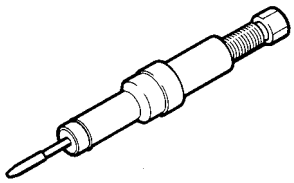
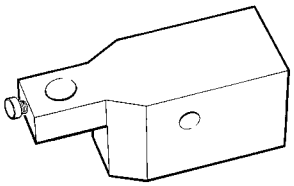
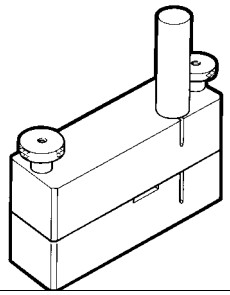
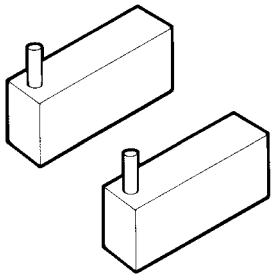
TOOLS

TOOL NO.		DESCRIPTION
99360337		Cylinder liner compression plate (to be used with 99360334-99360336)
99360351		Tool to stop engine flywheel
99360499		Tool to take down and fit back camshaft bushes
99360500		Tool to lift crankshaft
99360551		Bracket to take down and fit engine flywheel
99360553		Tool for assembling and installing rocker arm shaft

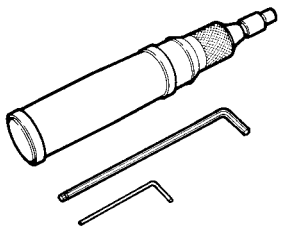
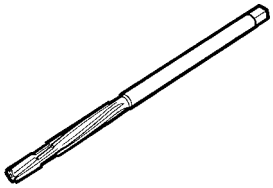
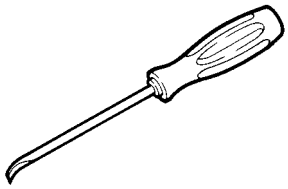
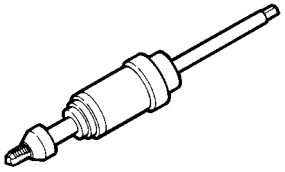
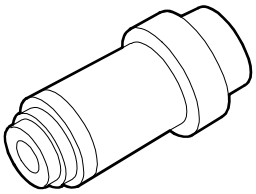
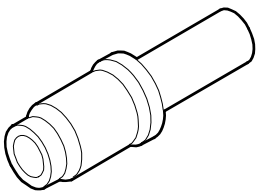
TOOLS

TOOL NO.		DESCRIPTION
99360585		Swing hoist for engine disassembly assembly
99360605		Belt to insert piston in cylinder liner (60 - 125 mm)
99360612		Tool for positioning engine P.M.S.
99360613		Tool for timing of phonic wheel on timing gear
99360703		Tool to stop cylinder liners
99360706		Tool to extract cylinder liners (to be used with specific rings)

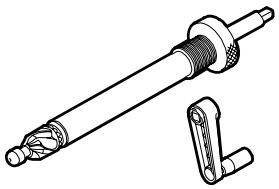
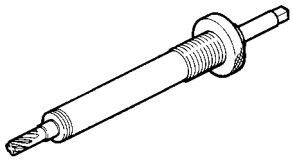
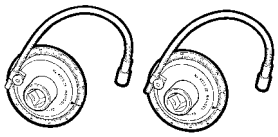
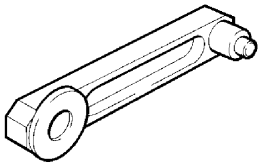
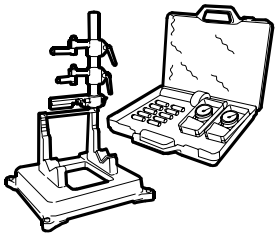
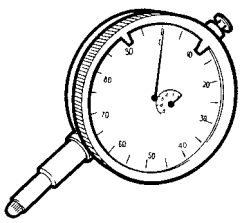
TOOLS

TOOL NO.		DESCRIPTION
99360726		Ring (125 mm) (to be used with 99360706)
99361036		Brackets fixing the engine to rotary stand 99322230
99365056		Tool for injector holder heading
99370415		Base supporting the dial gauge for checking cylinder liner protrusion (to be used with 99395603)
99378100		Tool for printing engine identification plates (to be used with special punches)
99378101* **99378103•** **99378105■**		Punches (**B**) for printing engine identification plates (to be used with 99378100)

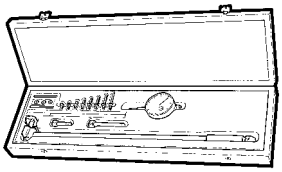
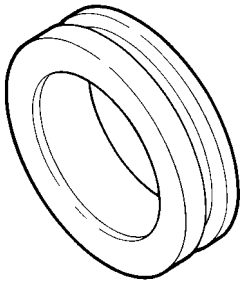
TOOLS

TOOL NO.		DESCRIPTION
99389834		Torque screwdriver for calibrating the injector solenoid valve connector check nut
99390311		Valve guide sleeker
99390772		Tool for removing injector holding case deposits
99390804		Tool for threading injector holding cases to be extracted (to be used with 99390805)
99390805		Guide bush (to be used with 99390804)
99394015		Guide bush (to be used with 99394041 or 99394043)

TOOLS

TOOL NO.		DESCRIPTION
99394041		Cutter to rectify injector holder housing (to be used with 99394015)
99394043		Reamer to rectify injector holder lower side (to be used with 99394015)
99395216		Measuring pair for angular tightening with 1/2" and 3/4" square couplings
99395218		Gauge for defining the distance between the centres of camshaft and transmission gear
99395363		Complete square to check connecting rod squaring
99395603		Dial gauge (0 - 5 mm)

TOOLS

TOOL NO.		DESCRIPTION
99395687		Reaming gauge (50 - 178 mm)
99396035		Centering ring of crankshaft front gasket cap