

CURSOR TIER 3 SERIES

Industrial application

C87

C87 ENT X

This publication provides unit and relevant component repair data, specifications, instructions and methodologies.

This publication has been drawn up for qualified and specialised personnel.

Before performing any operation check that the part relevant to the unit on which you must work is available along with all safety devices for accident-prevention, such as, goggles, helmet, gloves, shoes, etc. and hoisting and transporting equipment.

Operations are to be performed by following the indications included here, using the special equipment indicated and assuring proper repair, compliance with schedule and operator's safety requirements.

Each repair must aim to restore operating efficiency and safety in compliance with the FPT provisions.

FPT cannot be held liable for modifications, alterations or other interventions non authorised by FPT on the vehicle and if the unit is warranted the above mentioned interventions will cause its expiration.

FPT is not liable for repairing interventions.

FPT will provide further details required to carry out the interventions and all the instructions that are not included on this publication.

Data included in this publication may not be up-to-date therefore subject to Manufacturer's modifications that can be added at any time for technical or commercial purposes and also to meet new law regulations in other Countries.

If issues on this publication differ from what is actually noticed on the unit, please get in touch with the FPT network before starting any intervention".

It is forbidden to copy this text or any of its parts and all illustrations included.

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C87 ENT X Series

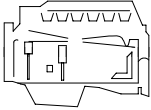
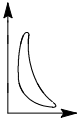
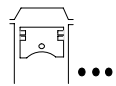
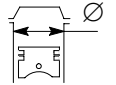
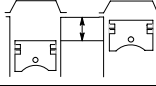
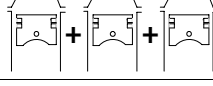

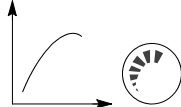
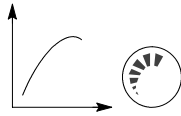


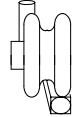

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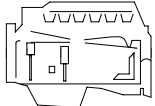
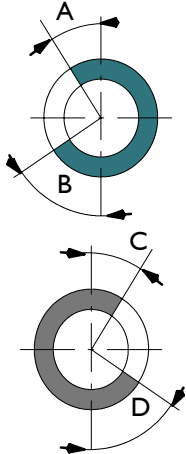
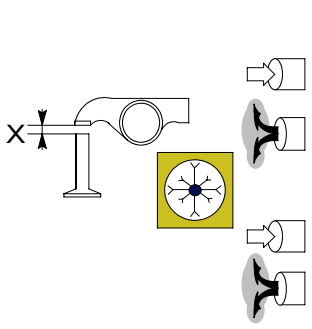
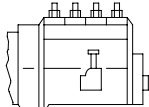
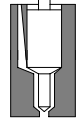
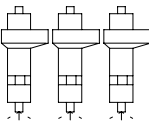
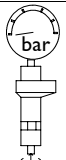
CORRESPONDENCE BETWEEN TECHNICAL CODE AND COMMERCIAL CODE

Technical Code	Commercial Code
F2CE9687B*E001	C87 ENT X
F2CE9687A*E001	


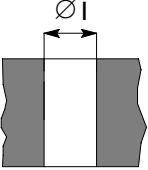
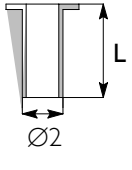


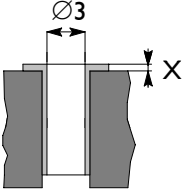
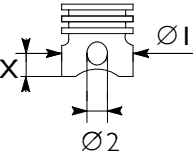


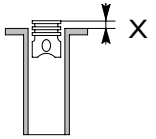
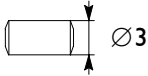

CLEARANCE DATA		TECHNICAL CODE	
	Type	F2CE9687	
		A*E	B*E
	Cycle Fuel feed Injection	4-stroke Diesel engine	
		Turbocharged	
		Direct	
	No. of cylinders	6 in line	
	Bore	mm	117
	Stroke	mm	135
	Total displacement	cm ³	8710
	Compression ratio	1: 15.9 ± 0.8	
	Maximum power	kW (HP) rpm	260 314 2100
			230 305 2100
	Max. torque	Nm (kgm) rpm	1500 1400
			1400 1400
	Loadless engine idling	rpm	-
	Loadless engine peak	rpm	-
	SUPERCHARGING Turbocharger type	Intercooler Direct injection HX40	
	LUBRICATION Oil pressure (warm engine) - idling - peak rpm	bar bar bar	Forced by gear pump, relief valve single action oil filter - -
	COOLING Water pump control Thermostat - start of opening	°C	Liquid Through belt 85

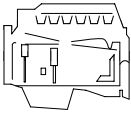
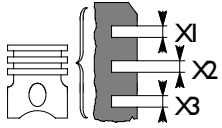
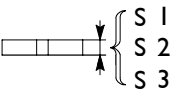


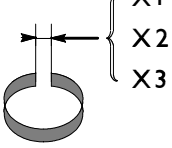
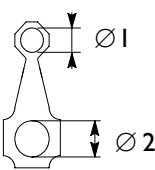
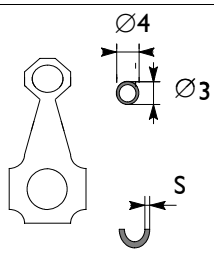




NOTE Data, features and performances are valid only if the setter fully complies with all the installation prescriptions provided by FPT.

Furthermore, the users assembled by the setter shall always be in conformance to couple, power and number of turns based on which the engine has been designed.

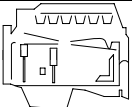
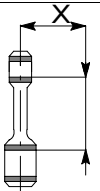
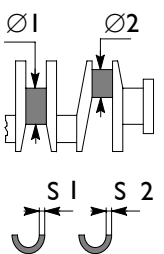
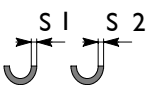
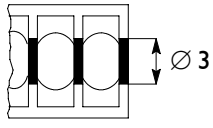


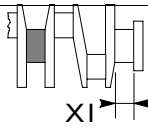
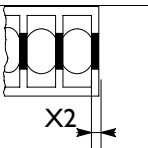
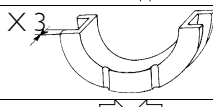

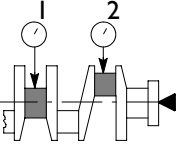

		TECHNICAL CODE	
 Type		F2CE9687	
		A*E	B*E
	<p>VALVE TIMING</p> <p>opens before T.D.C. A</p> <p>closes after B.D.C. B</p> <p>opens before B.D.C. D</p> <p>closes after T.D.C. C</p>	<p>17°</p> <p>31°</p> <p>48°</p> <p>9°</p>	
	<p>For timing check</p> <p>Running</p>	<p>× { mm</p> <p>mm</p> <p>× { mm</p> <p>mm</p>	<p>-</p> <p>-</p> <p>0.35 to 0.45</p> <p>0.55 to 0.65</p>
	FEED	Bosch Common Rail with CRIN2 injectors and high pressure pump CP3.3	
	Nozzle type	DLLA 137	
	Injection order	1 - 4 - 2 - 6 - 3 - 5	
	Injection pressure bar Injector calibration bar	1800	

ASSEMBLY CLEARANCE DATA

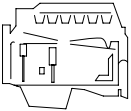
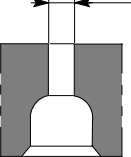
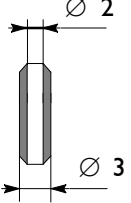



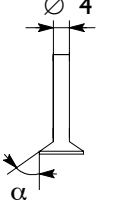



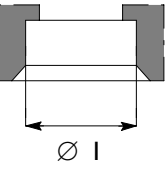


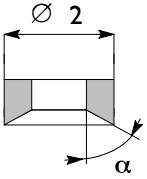


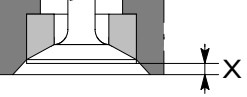





 Type	C87 ENT X	
CYLINDER BLOCK AND CRANKMECHANISM COMPONENTS		
mm		
 Bores for cylinder liners: upper $\varnothing 1$ lower $\varnothing 1$		130.500 to 130.525 129.510 to 129.535
 Cylinder liners: external diameter: upper $\varnothing 2$ lower $\varnothing 2$ length L		130.461 to 130.486 129.475 to 129.500 226,15 226.15
 Cylinder liners - crankcase bores upper lower		0.014 to 0.064 0.010 to 0.060
 External diameter $\varnothing 2$		-
 Cylinder sleeve inside diameter $\varnothing 3A^*$ inside diameter $\varnothing 3B^*$ Protrusion X * Selection class		117.000 to 117.012 117.010 to 117.022 0.035 to 0.065
 Pistons: measuring dimension X external diameter $\varnothing 1A$ external diameter $\varnothing 1B$ pin bore $\varnothing 2$		15 116.894 to 116.906 116.904 to 116.916 52.010 to 52.016
 Piston - cylinder sleeve A* B* * Selection class		0.094 to 0.118 0.094 to 0.118
 Piston diameter $\varnothing 1$		-
 Pistons protrusion X		0.873 to 1.117
 Gudgeon pin $\varnothing 3$		51.994 to 52.000
 Gudgeon pin - pin housing		0.010 to 0.022

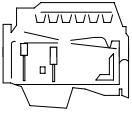
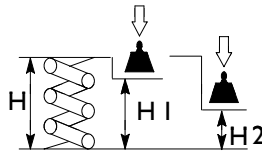
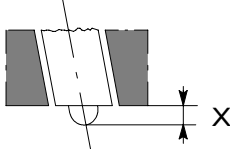
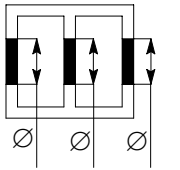
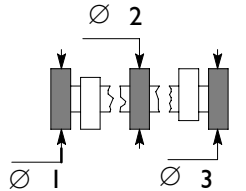
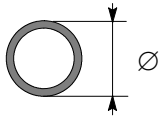
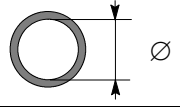


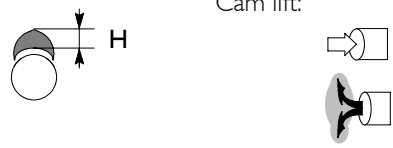
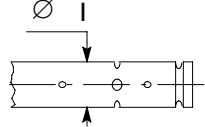
	Type	C87 ENT X	
		mm	
	Piston ring grooves	X1	3,120 ± 3,140
		X2	3.120 to 3.140
		X3	2.550 to 2.570
	Piston rings: trapezoidal seal	S1	3.000
	lune seal	S2	2.470 to 2.500
	milled scraper ring with slits and internal spring	S3	3.970 to 3.990
	Piston rings - grooves	1	-
		2	0.050 to 0.100
		3	0.030 to 0.070
	Piston rings		-
	Piston ring end gap in cylinder liners	X1	0.3 to 0.4
		X2	0.60 to 0.75
		X3	0.35 to 0.65
	Small end bush housing	∅1	55.700 to 55.730
	Big end bearing housing	∅2	85.987 to 86.013
	Selection classes	1	85.987 to 85.996
		2	85.997 to 86.005
	Small end bush diameter outside	∅4	55.780 to 55.820
	inside	∅3	52.015 to 52.030
	Big end bearing shell	S	
	Red		1.994 to 2.002
	Green		2.002 to 2.010
Yellow ●		2.010 to 2.018	
	Small end bush - housing		0.05 to 0.08
	Piston pin - bush		0.015 to 0.036
	Big end bearing		0.127 - 0.254 - 0.508
	Connecting rod weight	A	g
		Class A	3450 to 3470
		Class B	3471 to 3490
		Class C	3491 to 3510


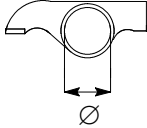





- Fitted in production only and not supplied as spares

		Type		C87 ENT X	
				mm	
	Measuring dimension	X		125	
	Max. connecting rod axis misalignment tolerance		=	0.08	
	Main journals		∅1		
	- nominal				92.970 to 93.000
	- class		1		92.970 to 92.980
	- class		2		92.980 to 92.990
	- class		3		92.990 to 93.000
	Crankpins		∅2		
	- nominal				81.915 to 81.945
	- class		1		81.915 to 81.925
	- class		2		81.925 to 81.935
	- class		3		81.935 to 81.945
	Main bearing shells		S1		
	Red				2.968 to 2.978
	Green				2.978 to 2.988
	Yellow*				2.988 to 2.998
	Big end bearing shells		S2		
	Red				1.994 to 2.002
Green				2.002 to 2.010	
Yellow*				2.010 to 2.018	
	Main bearing housings		∅3		
	- nominal				99.000 to 99.030
	- class		1		99.000 to 99.009
	- class		2		99.010 to 99.019
- class		3		99.020 to 99.030	
	Bearing shells - main journals				0.050 to 0.090
	Bearing shells - big ends				0.040 to 0.080
	Main bearing shells				0.127 - 2.254 - 0.508
	Big end bearing shells				0.127 - 2.254 - 0.508
	Main journal, thrust bearing		X1		39.96 to 40.04
	Main bearing housing, thrust bearing		X2		38.94 to 38.99
	Thrust washer halves		X3		3.38 to 3.43
	Crankshaft end float				0.10 to 0.30
	Alignment		1 - 2		-
	Ovalization		1 - 2		0.04
	Taper		1 - 2		-

* Fitted in production only and not supplied as spares

 Type	C87 ENT X	
CYLINDER HEAD - VALVE TRAIN		
mm		
 Valve guide housings in cylinder head	$\varnothing 1$	12.9800 to 12.997
 Valve guide	 $\varnothing 2$ $\varnothing 3$	8.023 to 8.038 13.012 to 13.025
 Valve guides - housings in the cylinder heads		0.015 to 0.045
 Valve guide	>	0.2 - 0.4
 Valves:	 $\varnothing 4$ α  $\varnothing 4$ α	7.970 to 7.985 60° 30' ± 7' 30" 7.970 to 7.985 45° $\begin{smallmatrix} +15 \\ -0 \end{smallmatrix}$
 Valve stem and its guide		0.040 to 0.070
 Valve seat in head	 $\varnothing 1$  $\varnothing 1$	41.985 to 42.020 40.985 to 41.020
 Outside diameter of valve seat; angle of valve seat in cylinder head:	 $\varnothing 2$ α  $\varnothing 2$ α	$\begin{smallmatrix} 0' \\ -0.5' \end{smallmatrix}$ 42.060 to 42.075 60° - 30' $\begin{smallmatrix} 0' \\ -0.5' \end{smallmatrix}$ 41.060 to 41.075 45° - 30'
 Recessing of valve	\times  \times 	0.5 to 0.8 1.6 to 1.9
 Between valve seat and head	 	0.040 to 0.090

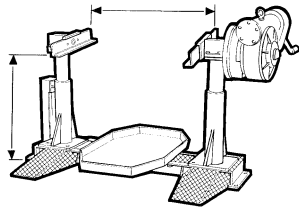
 Type		C87 ENT X	
		mm	
 Valve spring height: free height H under a load of: N 460 ± 23 H1A } N 460 ± 22 H1B } N 740 ± 33 H2A } N 731,4 ± 42 H2B }		A	B
		70.77	71.34
 Injector protrusion X	X	1.2 to 1.5	
 Camshaft bushing housing in the cylinder head: I ⇒ 7	∅	69.000 to 69.030	
 Camshaft bearing journals: I ⇒ 7	∅	64.924 to 64.080	
 Outer diameter of camshaft bushings:	∅	69.090 to 69.130	
 Inner diameter of camshaft bushings:	∅	65.080 to 65.116	
 Bushings and housings in the cylinder head		0.060 to 0.130	
 Bushings and bearing journals		0.100 to 0.192	
 Cam lift:		7.4034	8.2108
 Rocker shaft	∅ I	31.964 to 31.980	

 Type	C87 ENT X mm
 Bushing housing in rocker arms  	 32.025 to 32.041 32.025 to 32.041
 Between bushings and housings  	 0.045 to 0.077 0.045 to 0.077
TURBOCHARGER Type End float Radial play	 HX40 0.025 to 0.127 0.330 to 0.508

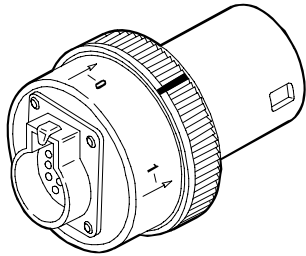
TOOLS

TOOL NO.

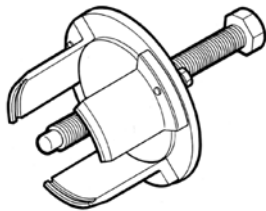
DESCRIPTION

99322230

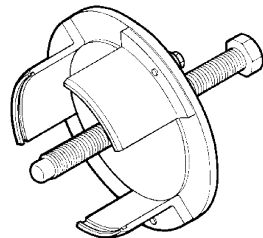
Rotary telescopic stand (range 2000 daN, torque 375 daNm)

99331043

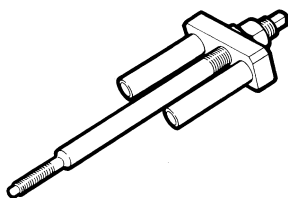
Tool to rotate engine flywheel (to be used with 99360325)

99340051

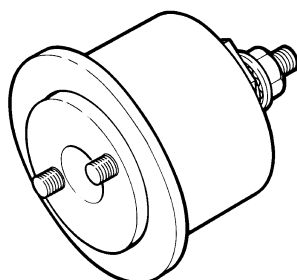
Extractor for crankshaft front gasket

99340054

Extractor for crankshaft rear gasket

99342149

Extractor for injector-holder

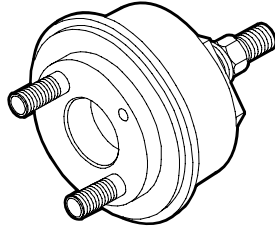
99346245

Tool to install the crankshaft front gasket

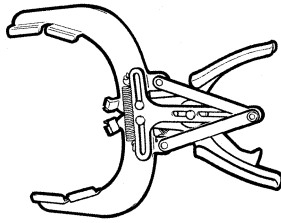
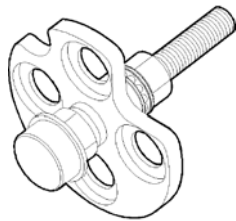
TOOLS

TOOL NO.

DESCRIPTION

99346260

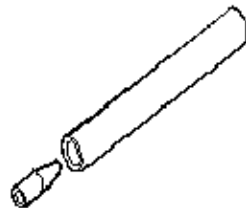
Percussion extractor

99360184Pliers for assembling and disassembling piston split rings
(105-106 mm)**99360264**

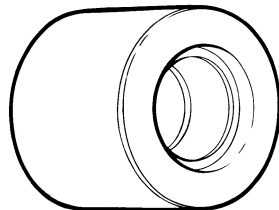
Universal extractor for 5 to 70 mm internal components

99360288

Box wrench for block junction bolts to the underblock

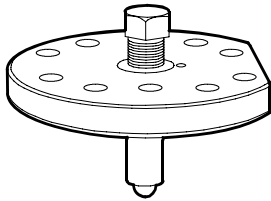
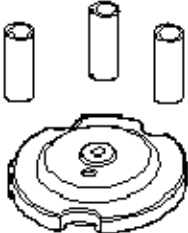
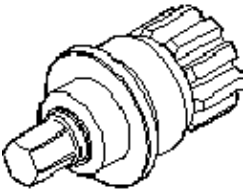
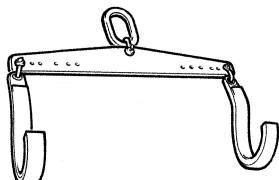
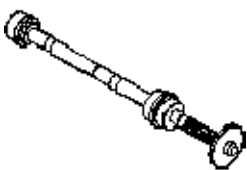
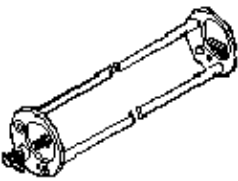
99360292

Box wrench for block junction bolts to the underblock

99360294

Tool to fit back valve guide (to be used with 99360481)

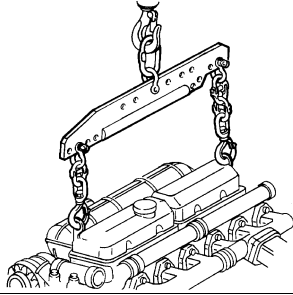
TOOLS

TOOL NO.		DESCRIPTION
99360334		Compression tool for checking the protrusion of cylinder liners (to be used with 99370415-99395603 and special plates)
99360335		Cylinder liner compression plate (to be used with 99360334-99360336)
99360341		Cylinder liner compression plate (to be used with 99360334-99360336)
99360500		Tool to lift crankshaft
99360505		Tool to lift crankshaft
99360558		Percussion extractor

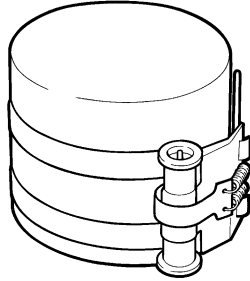
TOOLS

TOOL NO.

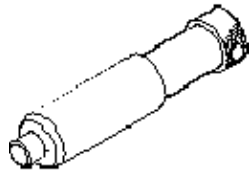
DESCRIPTION

99360585

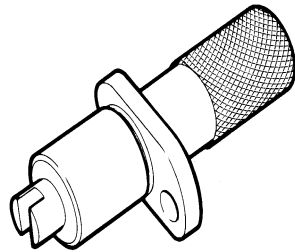
Swing hoist for engine disassembly assembly

99360605

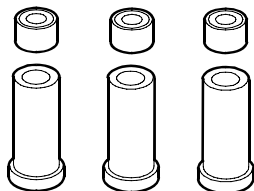
Belt to insert piston in cylinder liner (60 - 125 mm)

99360612

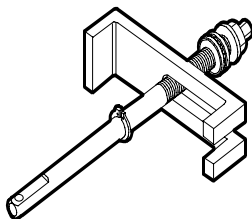
Tool for positioning engine P.M.S.

99360613

Tool for timing of phonic wheel on timing gear

99360703

Tool to stop cylinder liners

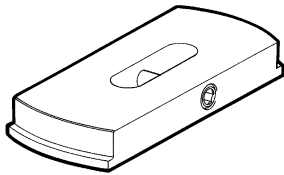
99360706

Tool to extract cylinder liners (to be used with specific rings)

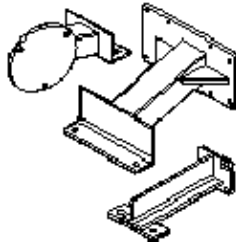
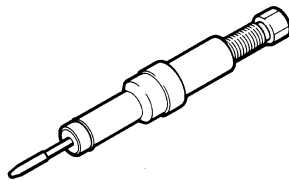
TOOLS

TOOL NO.

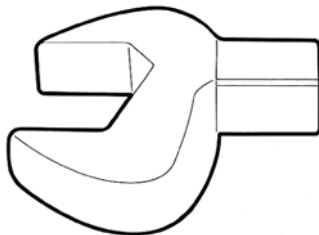
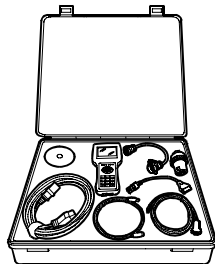
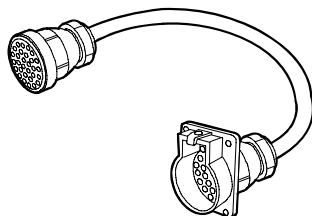
DESCRIPTION

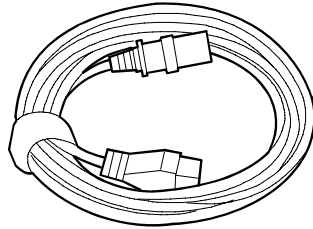
99360724

Ring (135 mm) (to be used with 99360706)

99361042Tool to take down-fit engine valves
(to be used with special plates)**99365054**

Tool for injector holder heading

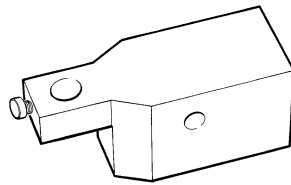
99368542Tool to take down-fit engine valves
(to be used with special plates)**99368554**Tool to take down-fit engine valves
(to be used with special plates)**99368555**Tool to take down-fit engine valves
(to be used with special plates)

TOOLS**TOOL NO.****DESCRIPTION****99368556**

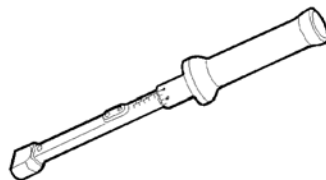
Tool to take down-fit engine valves
(to be used with special plates)

99368558

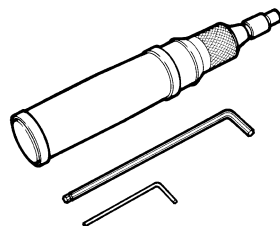
Tool to take down-fit engine valves
(to be used with special plates)

99370415

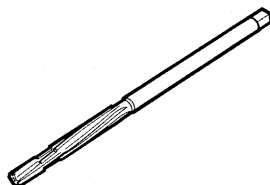
Base supporting the dial gauge for checking cylinder liner
protrusion (to be used with 99395603)

99389833

Base supporting the dial gauge for checking cylinder liner
protrusion (to be used with 99395603)

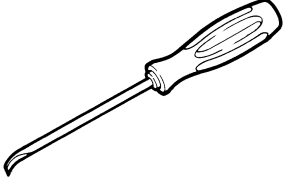
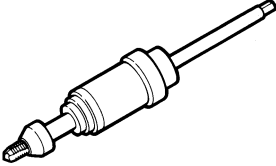
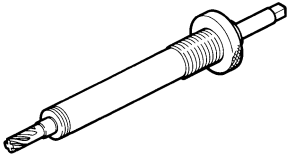
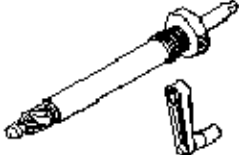
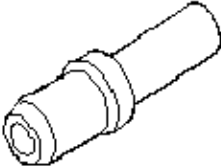
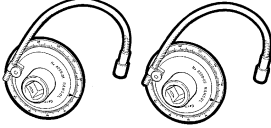
99389834

Torque screwdriver (1-6 Nm) for calibrating the injector solenoid
valve connector check nut

99390310

Valve guide sleeker

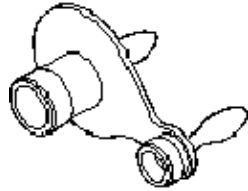
TOOLS

TOOL NO.	DESCRIPTION
99390772	Tool for removing injector holding case deposits
	
99390804	Tool for threading injector holding cases to be extracted (to be used with 99390805)
	
99394043	Reamer to rectify injector holder lower side (to be used with 99394015)
	
99394044	Reamer to rectify injector holder lower side (to be used with 99394015)
	
99394045	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
	

TOOLS

TOOL NO.

DESCRIPTION

99395221

Tool to take down-fit engine valves
(to be used with special plates)

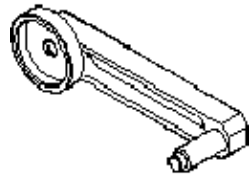
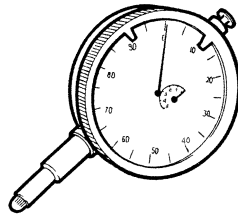
99395222

Plate for take down-fit engine valves
(to be used with 99360261)

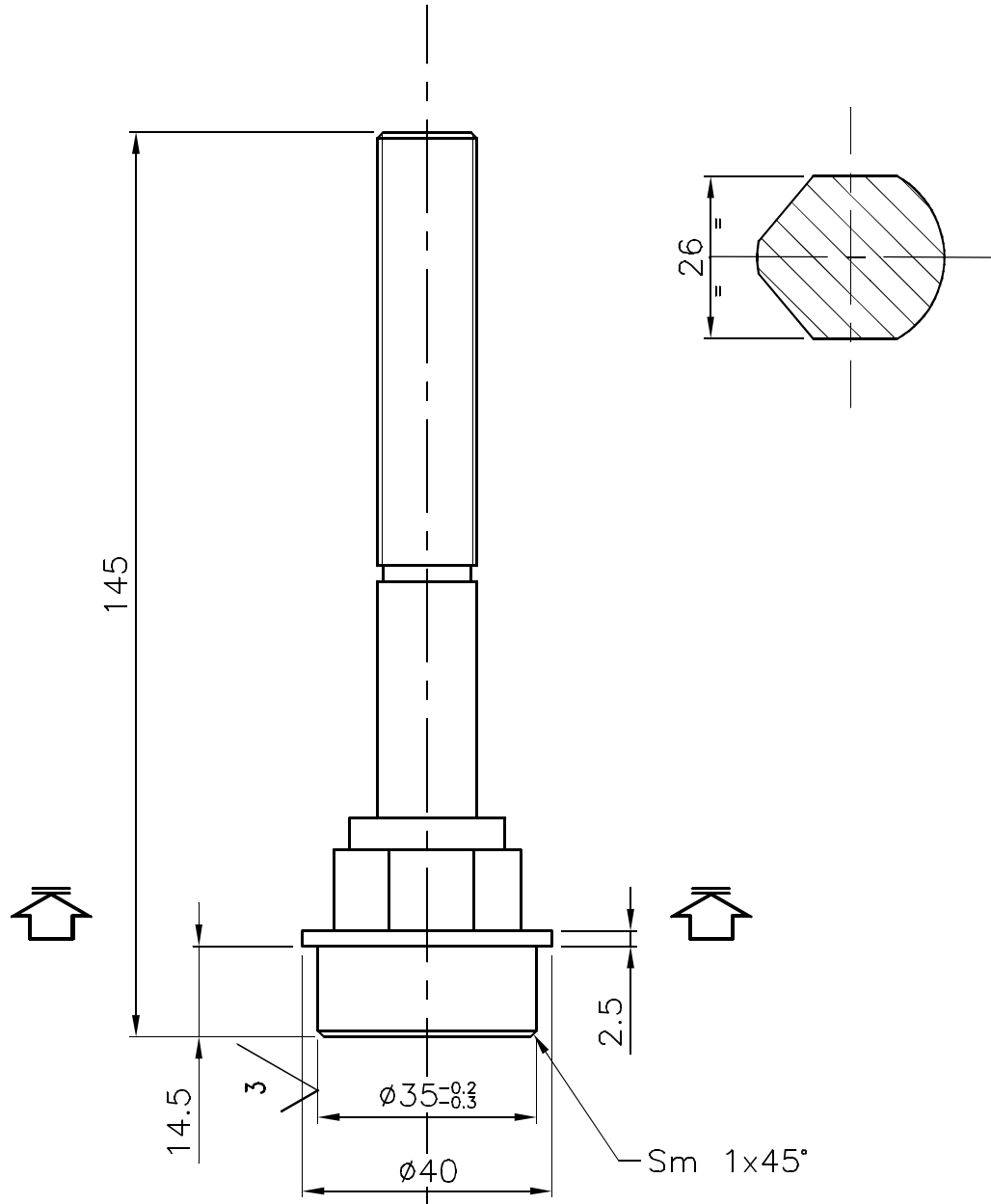
99395223

Tool to remove oil filter (engine)

99395603

Dial gauge (0 - 5 mm)

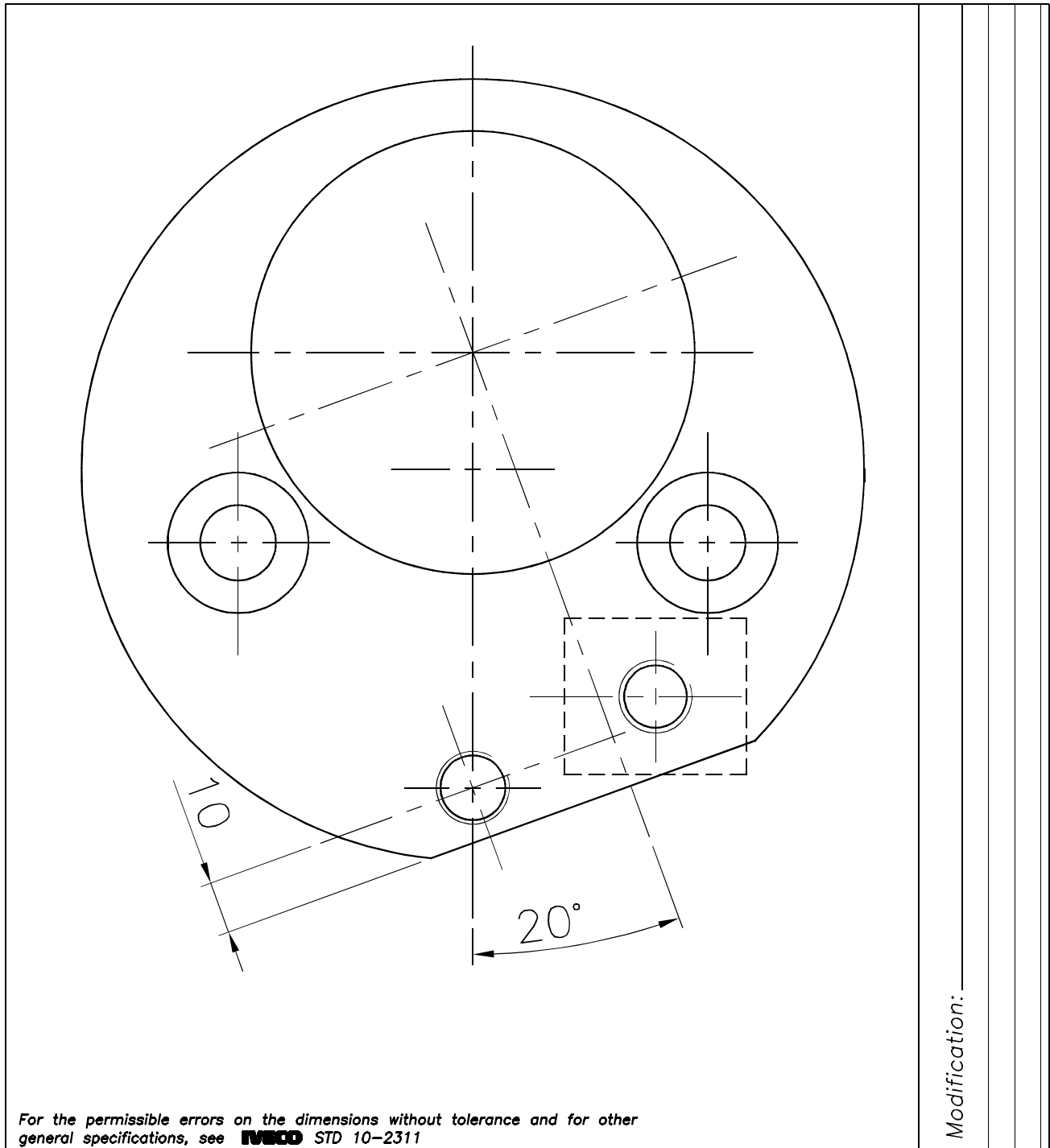
EQUIPMENT MODIFIED FOR ADAPTATION TO CURSOR 9 ENGINE



Modification:

For the permissible errors on the dimensions without tolerance and for other general specifications, see **IVECO** STD 10-2311

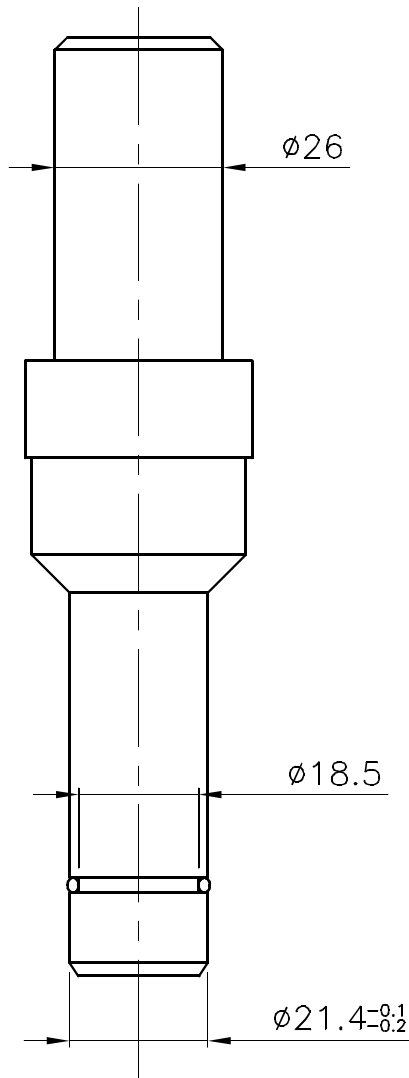
MAT.		COVER.	DRAWN UTS /	N°DRAWING 99360264		
All proprietary rights reserved by IVECO . This drawing shall not be reproduced or in any way utilised, for the manufacture or the component or unit herein illustrated and must not be released to other parties, without written consent. Any infringement will be legally pursued.	C/=0 I.S. 18-0011	Modifica per adeguamento		APPROVED	EXPER. SIZE A4	
		attrezzo a motore		DATE	SHEET	
		CURSOR 9		SUPERSEDES		
				SCALE 1:1		
		Q.TY 1				



Modification:

For the permissible errors on the dimensions without tolerance and for other general specifications, see **IVECO** STD 10-2311

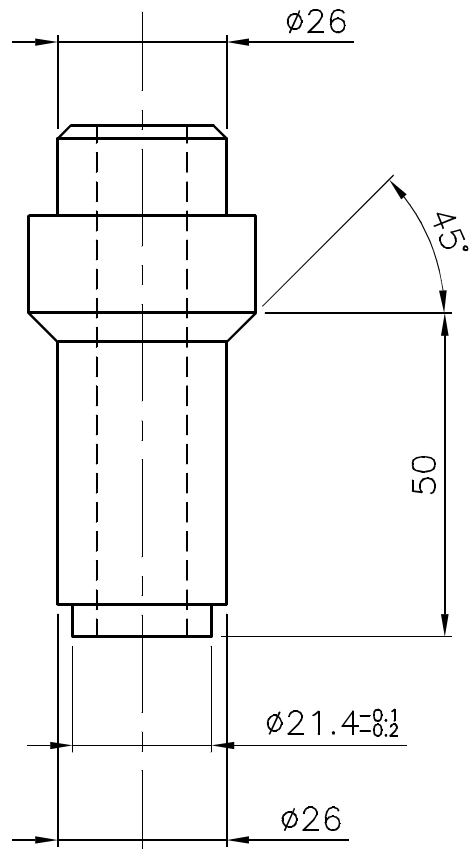
MAT.		COVER.	DRAWN UTS /	N°DRAWING 99360558		
All proprietary rights reserved by IVECO . This drawing shall not be reproduced or in any way utilised, for the manufacture or the component or unit herein illustrated and must not be released to other parties, without written consent. Any infringement will be legally pursued.		<i>Modifica per adeguamento</i>	APPROVED	EXPER.	SIZE A4	
		<i>attrezzo a motore</i>	DATE	SHEET		
		<i>CURSOR 9</i>	SUPERSEDES			
	<i>C/=0</i>		SCALE 1:1	IVECO		
	I.S. 18-0011		Q.TY 1			



Modification:

For the permissible errors on the dimensions without tolerance and for other general specifications, see **IVECO** STD 10-2311

MAT.		COVER.	DRAWN UTS /	N°DRAWING 99365054	
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		<i>attrezzo a motore</i>	DATE	SHEET	
		CURSOR 9	SUPERSEDES		
		SCALE 1:1	Q.TY 1	IVECO	



Modification:

For the permissible errors on the dimensions without tolerance and for other general specifications, see **IVECO** STD 10-2311

MAT.		COVER.	DRAWN UTS /	N°DRAWING 99390804	
All proprietary rights reserved by IVECO . This drawing shall not be reproduced or in any way utilised, for the manufacture or the component or unit herein illustrated and must not be released to other parties, without written consent. Any infringement will be legally pursued.		Modifica per adeguamento	APPROVED	EXPER.	SIZE A4
		attrezzo a motore	DATE	SHEET	
		CURSOR 9	SUPERSEDES		
	C/=0		SCALE	1:1	
	I.S. 18-0011		Q.TY	1	
			IVECO		

