

Product: Case B FL1011 T ENGINE Service Manual

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Workshop Manual

Deutz Service

B/FL 1011/T

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Personal answering from 8:15 a.m. to 5:00 p.m.



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FOREWORD

Reliable engine operation is dependent on properly executed repairs as well as adjustment work.

This Workshop Manual describes the appropriate operations for any repair and adjustment work on the engine and engine components. It is presumed that this work will be carried out by qualified personnel.

The Manual has been made up in a manner which ensures quick comprehension of the contents, i. e. graphic symbols have been placed beside the brief text passages, which visualize the working operation concerned.

Aspects of operation and maintenance are dealt with in the respective Engine Operation Manual.

For spare parts orders the spare parts catalogue should be referred to.

This Workshop Manual is not regularly updated. Any engineering changes having been introduced in the meantime will be considered in the next issue. Therefore please refer to the information announced in our Technical Circulars when carrying out repairs.

General:

- Please read carefully and observe the instructions given in this Workshop Manual. This will avoid accidents and will help to ensure that your engine always functions properly and reliably.
- Make sure that this Workshop Manual is readily available for everybody carrying out repair or adjustments and that the instructions are well understood.
- Non-compliance with given instructions may result in functional trouble and engine damage as well as personal injury for which the manufacturer shall not accept any liability.
- The relevant regulations for prevention of accidents as well as other general and legal rules regarding safety and industrial medicine are to be complied with.
- A prerequisite for successful repair is that all required equipment, hand and special tools are available and in perfect condition.
- Optimal operation economy, reliability and durability of the engine can be ensured only when using genuine DEUTZ parts.
- Remember that such engine components as springs, clips, snap rings, etc. involve the risk of injury if not handled with care.
- Engine overhauls must be based on the relevant engine duty schedule - as defined by the equipment manufacturer. For conversions only such parts should be used which DEUTZ develops and supplies specifically for this purpose.

Key to Symbols

	Disassembly of assembly groups		Guard against personal injury Indication of hazard
	Reassemble to form assembly group		Guard against material damage Damage to parts
	Remove obstructing parts		Prop up – Support – Hold
	Reinstall – Remount parts which had obstructed disassembly		Oil
	Attention! Important notice!		Grease
	Check – Adjust e. g. torque, dimensions, pressures, etc.		Mark before disassembly, observe marks when reassembling
	Special tool		Balance Eliminate any imbalance
	Note direction of installation		Filling – Topping up – Refilling e. g. oil, cooling water, etc.
	Visual inspection		Drain off e. g. oil, cooling water, etc.
	Possibly still serviceable Renew if necessary		Loosen – Release e. g. loosening a clamping device
	Renew at each reassembly		Tighten – Clamp e. g. tightening a clamping device
	Unlock – Lock e. g. split pin, locking plate, etc.		Vent
	Lock – Adhere e. g. with liquid sealant		Machining process
	See Technical Data (For inst. 67 as indication of the line)		

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Specification data

1

000 General engine data

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
001	Engine weight w/o starter w.generator ca. kg	162	202	242	248
002	Engine swept volume cm ³	1366	2049	2732	
003	Bore mm	91			
004	Stroke mm	105			
005	Direction of rotation	When facing flywheel left counter-clockwise			
006	Rated speed max. rpm	3000 / 3600			2500
007	Minimum idle speed rpm	900			
008	Working cycle	Four-stroke diesel			

000 General engine data

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
009	Combustion system	Direkt injection			
010	Compression ration	18,5 : 1			17 : 1
011	Compression pressure bar	25 - 30			22 - 27
012	Firing order	1 - 2	1 - 2 - 3	1 - 3 - 4 - 2	
020	Dimensions of engine incl. standard flywheel				
021	Max. length mm	522	630	741	
022	Max. width mm	444			490
023	Max. height mm	691		711	

Specification data

100 Fuel injection system

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
110	Fuel injection pump				
111	Make, model	OMAP			
112	Min. pres. that must be attained with abt. 5 rot. of crankshaft bar	300			
113	Pressure for testing tightness of relief valve bar	150, drop to 140 in a minute permiss.			
120	Governor				
121	Make, model	KHD			

100 Fuel injection system

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
130	Injection nozzle				
131	Make, model	OMAP			
132	Opening pres. (checking injector for re-use) bar	245 ⁺⁸			245 ⁺⁸ 1) 205 ⁺⁸
133	Opening pressure (new condition) bar	250 ⁺⁸			250 ⁺⁸ 1) 210 ⁺⁸

1

1) Engines for Messrs Holder

Specification data

100 Fuel injection system

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
140	Commencement of fuel delivery				
141	Static <u>w/o</u> advance / retard unit				
145	Installation dimension of injection pump mm		≍ 1800 57,3 ≍ 1801 56,8 1) 57,0		58,0

1) Engines for Messrs Holder

200-400 Cylinder unit

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
200	Cylinder head				
210	Valve guide				
211	Valve guide Outer dia. mm				
212	Valve guide bore in cyl. head mm				
213	Valve guide Inner dia. mm	8 +0,025			
220	Valve seat insert				
221	Valve seat insert Outer dia. Inlet mm	42,67 ±0,005			
222	Number of oversizes	1			

Specification data

200-400 Cylinder unit

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
223	Each oversize	0,2			
224	Valve seat Outer dia. Exhaust mm	37,07 ± 0,005			
225	Number of oversize	1			
226	Each oversize	0,2			
227	Valve seat insert bore Inlet mm	42,6 + 0,03			
228	Valve seat insert bore Exhaust mm	37 + 0,03			
230	Valve	-			
231	Valve stem dia. Inlet mm	7,98 - 0,015			

200-400 Cylinder unit

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
232	Valve stem dia. Exhaust mm	7,96 _{-0,015}			
233	Valve stem clearance Inlet standard mm	0,02 - 0,06			
234	Valve stem clearance Inlet Wear limit mm	0,12			
235	Valve stem clearance Exhaust standard mm	0,04 - 0,08			
236	Valve stem clearance Exhaust Wear limit mm	0,15			
237	Valve head Ø Inlet mm	40,1 ± 0,1			40,5 ± 0,1
238	Valve head Ø Exhaust mm	34,9 ± 0,1			

Specification data

200-400 Cylinder unit

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
239	Valve seat width Inlet mm	1,7 ±0,4			1,58 ±0,4
240	Valve seat width Exhaust mm	1,7 ±0,4			
241	Seat angle Inlet deg.	45			30
242	Seat angle Exhaust deg.	45			
243	Marg. thickness Inlet standard mm	1,25			1,87
244	Marg. thickness Exhaust standard mm	1,85			
245	Marg. thickness Inlet Wear limit mm	0,8			1,4
246	Marg. thickness Exhaust Wear limit mm	1,2			

200-400 Cylinder unit

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
250	Valve spring				
251	Number per valve		1		
252	Windings total		6,2		
253	Length unloaded standard mm		44,3		
254	Length unloaded Fatigue limit mm				
260	Standard Valve clearance				
261	Inlet mm		0,3		
262	Exhaust mm		0,5		

Specification data

200-400 Cylinder unit

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
270	Distances to be checked				
271	Valve recess standard mm	1 ±0.13			0,8 ±0.13
272	Wear limit mm	1,53			1,3

200-400 Cylinder unit

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
280	Cylinder head studs				
281	Length standard mm	185 ±0.8			
282	Length Limit mm				

Specification data

200-400 Cylinder unit

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
300	Cylinder				
301	Bore standard mm	91 +0.02			
302	Bore Wear limit mm	0,1			
303	Number of oversizes				
304	Each oversize mm				

200-400 Cylinder unit

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
400	Piston				
401	Diameter standard mm	90,93			90,92
402	Number of oversizes				
403	Each oversize mm				
404	Distance between piston and cylinder head mm				
405	Bore for piston pin mm	26 $\begin{matrix} +0,01 \\ +0,004 \end{matrix}$			30 $\begin{matrix} +0,01 \\ +0,004 \end{matrix}$
406	Piston pin diameter mm	26 $-0,005$			30 $-0,005$

Specification data

200-400 Cylinder unit

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
410	Piston ring groove height				
411	1st ring mm	2,0 ^{+0,10} / _{+0,08}			
412	2nd ring mm	2,0 ^{+0,07} / _{+0,05}			2,5 ^{+0,08} / _{+0,06}
413	3rd ring mm	3,0 ^{+0,04} / _{+0,02}			3,5 ^{+0,05} / _{+0,03}

200-400 Cylinder unit

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
420	Piston rings				
421	Axial clearance 1st ring standard mm	0,09 - 0,12			
422	Wear limit mm	0,2			
423	Axial clearance 2nd ring standard mm	0,07 - 0,102			
424	Wear limit mm	0,16			
425	Axial clearance 3rd ring standard mm	0,04 - 0,075			
426	Wear limit mm	0,12			

Specification data

200-400 Cylinder unit

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
429	Gap 1st ring standard mm	0,3 - 0,5			0,3 - 0,45
430	Wear limit mm	0,8			
431	Gap 2nd ring standard mm	0,8 - 1,05			
432	Wear limit mm	1,8			
433	Gap 3rd ring standard mm	0,45 - 0,7			
434	Wear limit mm	1,2			
		-			

500-700 Motion parts

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
500	Crankshaft				
510	Crankpin				
511	Pin width standard mm	31			
512	Pin diameter standard I mm	55 ^{-0,01} _{-0,03}			
513	Pin diameter standard II mm				
514	Each undersize mm	0,25			
515	Limit for undersize mm	54,5 ^{-0,01} _{-0,03}			
516	Pin ovality Waer limit mm	0,01			

Specification data

500-700 Motion parts

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
517	Radius of fillet mm				
518	Pin hardness standard HRc	non-hardened, strength-rolled			
519	Limit value HV 1				
520	Main journal				
521	Journal width standard mm			35	
522	Journal dia. standard I mm			70 ^{-0,01} -0,03	
523	Journal dia. standard II mm				
524	Each undersize mm			0,25	

500-700 Motion parts

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
525	Limit for undersize mm	69,5 ^{-0,01} _{-0,03}			
526	Journal ovality Wear limit mm	0,008			
527	Eccentricity max. perm. mm	0,05			
528	Radius of fillet mm				
529	Journal hardness, standard HRc	non-hardened, strength-rolled			
530	Limit value HV 1				
540	Thrust bearing journal				
541	Journal width standard I mm	35 ^{+0,04}			

Specification data

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500-700 Motion parts

1

	English	F2L 1011	F3L 1011	F4L 1011	BF4L 1011 T
542	Journal width standard II mm				
543	Each oversize mm			0,4	
544	Limit for oversize mm			35,44	
550	Main bearing				
551	Bearing shells inner dia. standard I mm			70,02 - 70,055	
552	Bearing shells inner dia. standard II mm				
553	Each undersize mm			0,25	
554	Limit for undersize mm			69,52 - 69,555	

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