










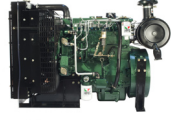


VARIABLE SPEED DIESEL ENGINES

FUEL		AIR COOLED										LIQUID COOLED							
COOLING																			
Key to Emissions Compliance																			
EU Stage 3A only		AC1		K172		LT1		TR2		LPW3		LPWT4							
USA EPA Interim Tier 4 only																			
EU Stage 3A, USA EPA Interim Tier 4																			
Engine series		A Series		K Series		L Series		T Series			ALPHA								
Engine model		AC1	AD1	K164		K172		LT1	LV1	TR1	TR2	TR3	LPW2	LPW3	LPW4	LPWT4			
V build (=variable speed)		V	V	V		V		V	V	V	V	V	V	V	V	V			
Minimum full-load speed (r/min)		1500	1500	2000		2000		1000	1000	1500	1500	1500	1500	1500	1500	1500			
Maximum full-load speed (r/min)		3000	3000	3600		3600		3000	3000	2500	2500	2500	3000	3000	3000	3000			
Number of cylinders: L=in-line; H=horizontal		1 L	1 L	1 L		1 L		1 L	1 L	1 L	2 L	3 L	2 L	3 L	4 L	4 L			
Bore (mm)		76	80	78		86		83	86	98	98	98	86	86	86	86			
		in.	2.99	3.15	3.07		3.38		3.25	3.38	3.89	3.89	3.89	3.39	3.39	3.39	3.39		
Stroke (mm)		mm	67	73	64		72		76	83	102	102	80	80	80	80			
		in.	2.64	2.87	2.52		2.83		3.00	3.25	4.00	4.00	4.00	3.15	3.15	3.15	3.15		
Displacement per cylinder		litres	0.30	0.37	0.305		0.418		0.41	0.48	0.77	0.77	0.47	0.47	0.47	0.47			
		in ³	18.3	22.6	18.6		25.5		25.0	29.3	47.0	47.0	28.7	28.7	28.7	28.7			
Injection: D=direct; I=indirect		Direct		Direct		Direct		Direct		Direct			Direct						
Aspiration: N=natural; T=turbo; I=intercooled		Natural		Natural		Natural		Natural		Natural			Natural			Turbo			
Starting: H=hand; R=rope; E=electric; ()=optional		H (R)(E)		H (R)(E)		R (E)		R (E)		H (E)		H (E)		H (E)		E	E		
Variable Speed Builds Outputs to ISO 3046	1500 r/min	Continuous	kW	2.1	2.5				3.0	3.5	5.5	11.0	16.8	6.8	10.3	13.6	20.7		
			bhp	2.8	3.4				4.0	4.8	7.4	14.8	22.5	9.1	13.8	18.2	27.7		
			Fuel Stop	kW	2.3	2.8				3.3	3.9	6.1	12.1	18.5	7.5	11.3	15.0	22.3	
		1800 r/min	Continuous	bhp	3.1	3.7				4.4	5.2	8.2	16.2	24.8	10.0	15.1	20.1	29.9	
				kW	2.4	2.4				3.6	4.3	6.7	13.1	20.2	8.5	12.8	17.0	26.4	
				bhp	3.2	3.2				4.8	5.8	9.0	17.6	27.1	11.4	17.2	22.7	35.3	
	2000 r/min	Continuous	kW	2.7	3.3		3.2		4.0	4.7	7.4	14.4	22.2	9.4	14.1	18.7	28.5		
			bhp	3.6	4.4		4.3		5.3	6.3	9.9	19.3	29.8	12.6	18.9	25.1	38.2		
			Fuel Stop	kW	2.8	3.4	2.1			4.0	4.8	7.3	14.5	22.2	9.6	14.5	19.3	28.7	
		2500 r/min	Continuous	bhp	3.8	4.6	2.8			5.4	6.4	9.8	19.4	29.8	12.9	19.4	25.9	38.5	
				kW	3.1	3.7	2.3			4.4	5.3	8.0	16.0	24.4	10.6	15.9	21.2	31.0	
				bhp	4.2	5.0	3.1			5.9	7.0	10.7	21.5	32.7	14.2	21.3	28.4	41.5	
	3000 r/min	Continuous	kW	3.7	4.3	2.8	2.5	4.3	3.9	5.0	5.8	8.6	17.3	25.9	11.8	17.7	23.6	34.3	
			bhp	5.0	5.8	3.7	3.4	5.7	5.3	6.7	7.8	11.5	23.2	34.7	15.8	23.7	31.6	46.0	
			Fuel Stop	kW	4.1	4.8	3.0	2.8	4.7	4.3	5.5	6.4	9.5	19.0	28.5	13.0	19.5	26.0	36.7
		3600 r/min	Continuous	bhp	5.5	6.4	4.1	3.7	6.3	5.8	7.4	8.6	12.7	25.5	38.2	17.4	26.1	34.8	49.1
				kW	4.5	5.3	3.3	3.1	5.2	4.9	5.6	6.7				13.4	20.1	26.8	37.5
				Fuel Stop	kW	6.0	7.1	4.4	4.1	7.0	6.6	7.5	9.0				18.0	27.0	35.9
	3600 r/min	Continuous	bhp	4.9	5.8	3.7	3.4	5.7	5.4	6.2	7.4				14.7	22.1	29.5	40.2	
			kW	6.6	7.8	5.0	4.6	7.6	7.2	8.3	9.9				19.7	29.6	39.5	53.9	
			Fuel Stop	kW				3.6		5.7									
	Max. torque (V-build only)	Nm		15.7	18.6	11.8	10.8	18.4	17.2	21.0	25.0	39.2	77.0	118	50.6	75.9	102	151	
			lbf ft	11.6	13.7	8.7	8.0	13.6	12.7	15.5	18.5	28.9	56.8	86.9	37.3	56.0	75.1	112	
	Max. BMEP (bar)			5.3	5.8	4.84	4.45	5.53	5.16	6.0	6.2	5.9	5.9	6.4	6.4	6.4	8.9		
Weight ⁽¹⁾	kg		47	53	33		47		92	92	153	185	230	112	150	180	186		
		lb	103	117	72.6		103.4		203	203	337	408	507	247	330	396	409		
Length ⁽²⁾	mm		456	456	385		420		403	403	444	571	698	496	596	696	786		
		in.	17.9	17.9	15.2		16.5		15.8	15.8	17.5	22.5	27.4	19.5	23.5	27.4	30.9		
Width	mm		412	412	420		440		424	424	521	521	521	470	470	470	480		
		in.	16.2	16.2	16.5		17.3		16.7	16.7	20.5	20.5	20.5	18.5	18.5	18.5	18.9		
Height	mm		458	509	450		495		503	503	683	683	683	574	574	574	574		
		in.	18.0	20.0	17.7		19.5		19.8	19.8	26.9	26.9	26.9	22.6	22.6	22.6	22.6		



VARIABLE SPEED DIESEL ENGINES

FUEL		DIESEL															
COOLING		LIQUID COOLED															
Key to Emissions Compliance																	
EU Stage 3A only		ALPHA (Emissions Compliant)			DELTA	SW20	SIGMA		GAMMA								
USA EPA Interim Tier 4 only		LPWS2	LPWS3	LPWS4	DWS4	SW20	SW25	SW30	GW4	GWT4	GWTA6-2A	GWTA6					
EU Stage 3A, USA EPA Interim Tier 4		Engine series			Engine model		V build (=variable speed)		Minimum full-load speed (r/min)		Maximum full-load speed (r/min)						
		V	V	V	V	V	V	V	V	V	V	V					
		1500	1500	1500	1200	1500	1500	1500	1500	1500	1500	1500					
		3000	3000	3000	2500	2000	2200	2200	2200	2200	2200	2200					
		Number of cylinders: L=in-line; H=horizontal		2L	3L	4L	4 L	3L	3L	4L	4 L	6 L	6 L				
		Bore (mm)		86	86	86	94	91	105	102 ^[4]	100	100	100				
		in.		3.39	3.39	3.39	3.70	3.60	4.13	4.02	3.94	3.94	3.94				
		Stroke (mm)		80	80	80	120	127	110	110	127	127	127				
		in.		3.15	3.15	3.15	4.72	5	4.33	4.33	5.00	5.00	5.00				
		Displacement per cylinder		0.47	0.47	0.47	0.83	0.83	0.95	0.90	0.99	0.99	0.99				
		litres		28.7	28.7	28.7	50.1	50.8	58.1	55.0	60.4	60.4	60.4				
		in. ³															
		Injection: D=direct; I=indirect		Indirect			Indirect	Direct		Direct							
		Aspiration: N=natural; T=turbo; I=intercooled		Natural			Natural	Natural		Natural	Turbo	Turbo	Turbo, Intercooled				
		Starting: H=hand; R=rope; E= electric; ()=optional		E	E	E	E	E	E	E	E	E	E				
Variable Speed Builds	Outputs to ISO 3046	1500 r/min	Continuous	kW	7.4	11.1	14.7	28.7	21.8	26.4	30.9	36.4	54.5	76.4	92.7		
				bhp	9.9	14.9	19.7	38.5	29.3	35.4	44.2	48.7	73.1	102	124		
			Fuel Stop	kW	8.1	12.2	16.2	31.6	24.0	29.0	34.0	40.0	60.0	84.0	102		
				bhp	10.9	16.4	21.7	42.4	32.2	38.9	48.6	53.6	80.4	113	138		
			1800 r/min	Continuous	kW	9.1	13.6	18.2									
					bhp	12.2	18.2	24.4									
		Fuel Stop	kW	10.0	15.0	20.0											
			bhp	13.4	20.1	26.8											
		2000 r/min	Continuous	kW	10.1	15.2	20.2	36.6	26.1	32.2	36.4	39.0	61.8	89.1	109.5		
				bhp	13.5	20.4	27.0	49.1	35.0	43.2	48.7	52.4	82.8	119.4	146.8		
			Fuel Stop	kW	11.1	16.7	22.2	40.3	28.7	35.4	40.0	43.0	68.0	98.0	120.5		
				bhp	14.9	22.3	30.0	54.0	38.5	47.5	53.6	57.6	91.1	131.3	161.5		
			2500 r/min	Continuous	kW	12.2	18.3	24.4	44.1		33.1 ^[3]	38.2 ^[3]	43.6 ^[3]	65.6 ^[3]	90.9 ^[3]	113 ^[3]	
					bhp	16.3	24.5	32.7	59.1		44.4 ^[3]	51.2 ^[3]	58.5 ^[3]	85.3 ^[3]	121.8 ^[3]	151 ^[3]	
		Fuel Stop	kW	13.4	20.1	26.8	48.5		36.4 ^[3]	42.0 ^[3]	48.0 ^[3]	70.0 ^[3]	100.0 ^[3]	124 ^[3]			
			bhp	18.0	26.9	35.9	65.0		48.8 ^[3]	56.3 ^[3]	64.3 ^[3]	93.8 ^[3]	134.0 ^[3]	166 ^[3]			
		3000 r/min	Continuous	kW	13.4	20.1	26.8										
				bhp	18.0	26.9	35.9										
			Fuel Stop	kW	14.7	22.1	29.5										
				bhp	19.7	29.6	39.5										
			Max. torque (V-build only)	Nm	53.1	79.7	106	201.2	149	185	215	253	380	532	645		
				lbf ft	39.2	58.8	78.3	148	110	136	158	188	281	394	475		
		Weight ^[1]	kg	112	150	180	245	344	441	485	540	550	740	760			
			lb	247	330	396	539	758	971	1069	1190	1213	1630	1674			
Length ^[2]	mm	496	596	696	781	953	1065	1198	1260	1260	1540	1610					
	in.	19.5	23.5	27.4	30.7	37.5	41.9	47.2	49.6	49.6	60.6	63.4					
Width	mm	470	470	470	570	647	730	730	706	720	716	800					
	in.	18.5	18.5	18.5	22.4	25.5	28.7	28.7	27.8	28.3	28.2	31.5					
Height	mm	574	574	574	712	827	978	982	950	950	1108	1064					
	in.	22.6	22.6	22.6	28.0	32.6	38.5	38.7	37.4	37.4	43.6	41.9					