

workshop manual for V8.640 & TV8.640 diesel engines

©
Perkins Engines Limited
Peterborough England
1983

Publication No. 601 TPD 0983 1149

This publication supersedes the previous edition numbered 601 SER 0880 1149 and incorporates Amendment Page Set No. 1, issued July 1984.

This publication is written for world wide use. In territories where legal requirements govern engine smoke emission, noise, safety factors etc., then all instructions, data and dimensions given must be applied in such a way that, after servicing (preventive maintenance) or repairing the engine, it does not contravene the local regulations when in use.

CONTENTS

	SECTION
ENGINE VIEWS	A
TECHNICAL DATA	B
OPERATING AND MAINTENANCE	C
FAULT FINDING	D
CYLINDER HEAD	E
PISTONS AND CONNECTING RODS	F
CYLINDER BLOCK AND LINERS	G
CRANKSHAFT AND MAIN BEARINGS	H
TIMING CASE AND DRIVE	J
TIMING	K
LUBRICATING SYSTEM	L
COOLING SYSTEM	M
FUEL SYSTEM AND AIR CLEANERS	N
FLYWHEEL AND FLYWHEEL HOUSING	P
TURBOCHARGER	Q
COMPRESSOR	R
ELECTRICAL EQUIPMENT	S
LUBRICATING OIL DATA	APPENDIX
SERVICE FACILITIES	APPENDIX
APPROVED SERVICE TOOLS	APPENDIX
INDEX	APPENDIX

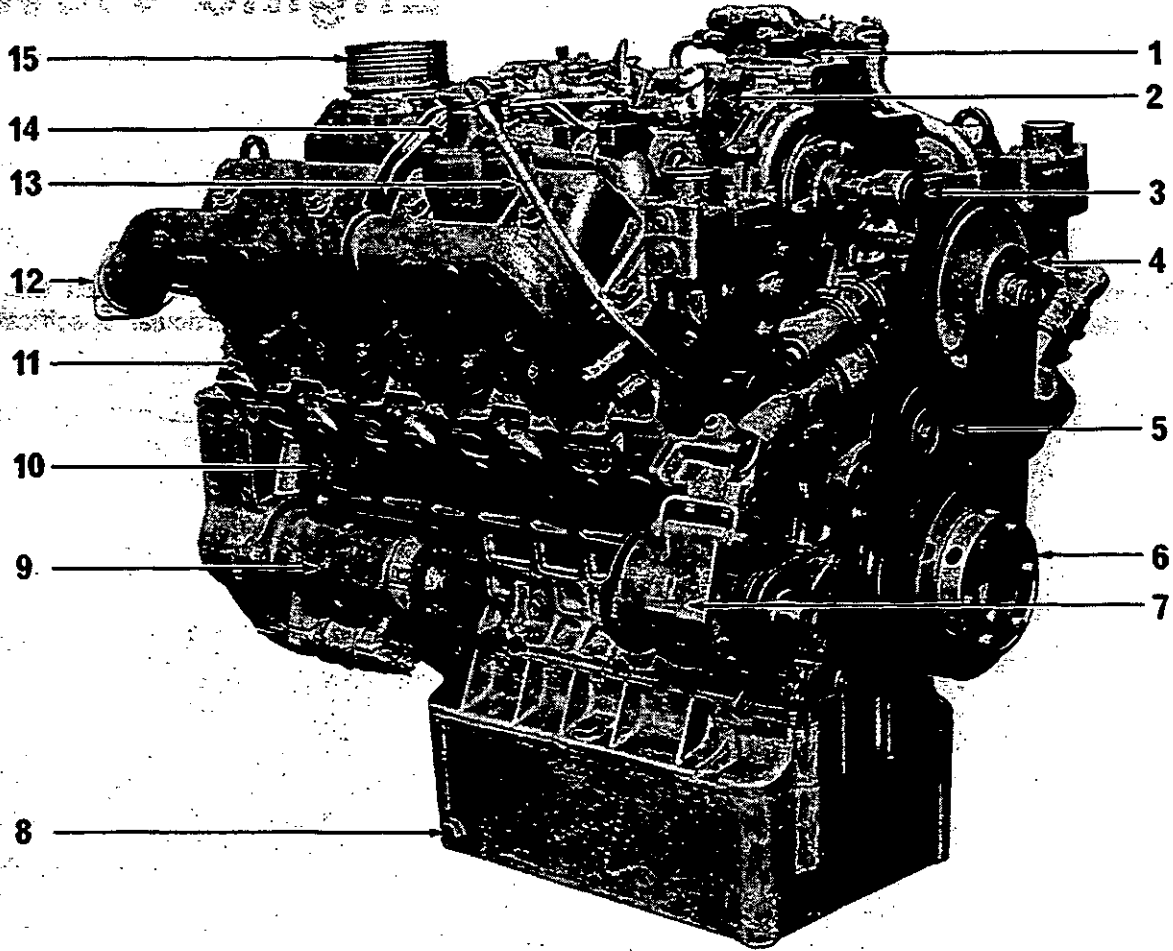
SECTION A

Engine Views

Perkins engines are built to individual requirements to suit the applications for which they are intended and the following engine views do not necessarily typify any particular specification.

ENGINE VIEWS—A.2

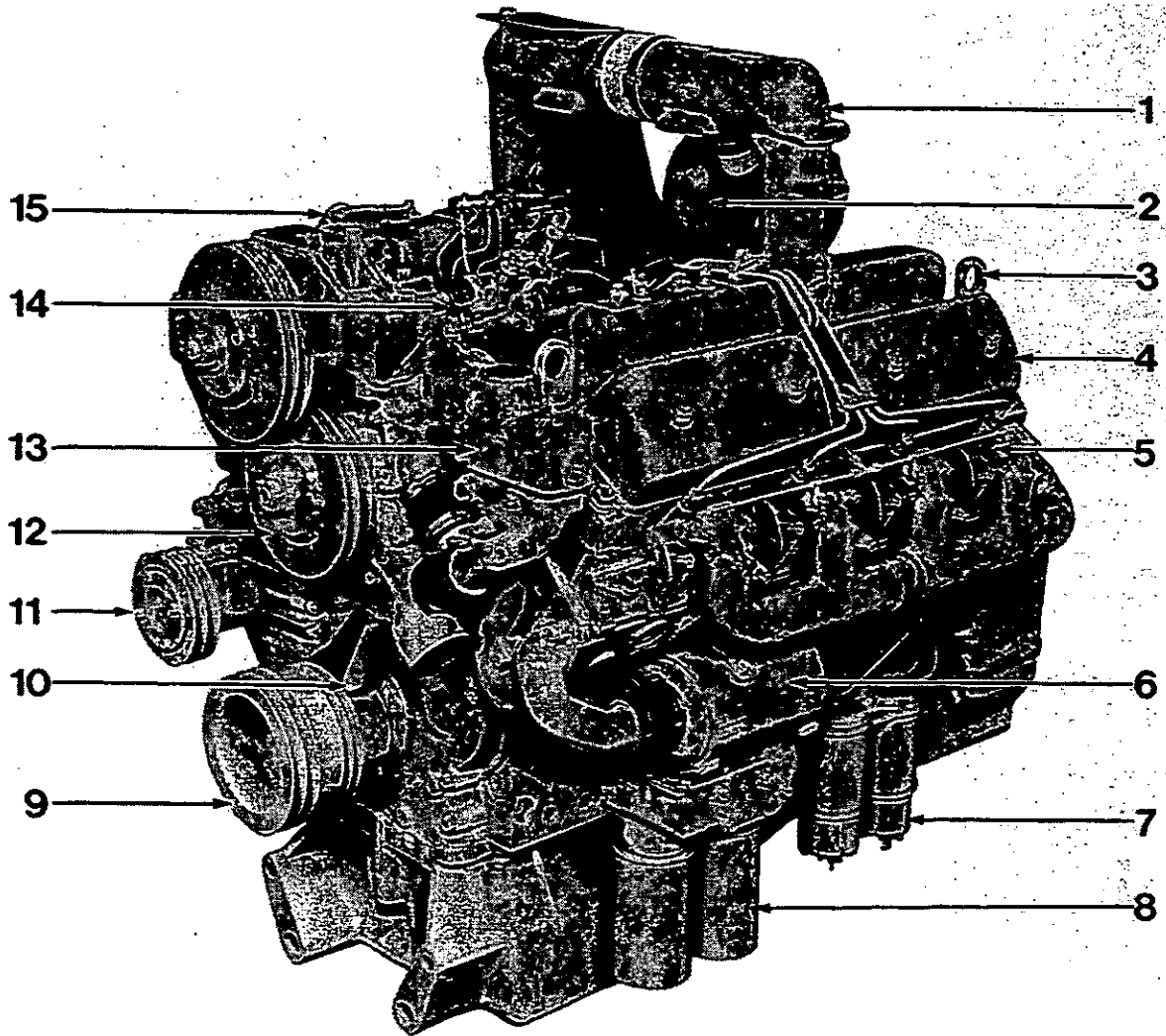
twelve engine



A1

FRONT RIGHT HAND SIDE VIEW OF V8.640 ENGINE

1. Compressor.
2. Fuel Lift Pump.
3. Tachometer Drive Generator.
4. Water Pump Pulley.
5. Belt Tensioner Pulley.
6. Crankshaft Pulley and Barring Ring.
7. Alternator.
8. Sump Drain Plug.
9. Starter Motor.
10. Right Hand Cylinder Block Drain Tap.
11. Atomiser Clamp.
12. Right Hand Exhaust Manifold.
13. Dipstick Tube.
14. Oil Filler.
15. Air Intake.



A2

**FRONT LEFT HAND SIDE VIEW OF
TURBOCHARGED V8.640 ENGINE**

1. Induction Manifold Cross Over Pipe.
2. Turbocharger.
3. Rear Left Hand Lifting Bracket.
4. Rear Left Hand Rocker Cover.
5. Atomiser.
6. Lubricating Oil Cooler.
7. Fuel Oil Filters.
8. Lubricating Oil Filters.
9. Crankshaft Pulley.
10. Crankshaft Timing Bracket.
11. Belt Tensioner Pulley.
12. Water Pump Pulley.
13. Left Hand Thermostat Housing.
14. Fuel Injection Pump.
15. Fuel Lift Pump.

SECTION B
Technical Data

TECHNICAL DATA—B.2

Engine Data

Type	Eight Cylinder, Four Stroke, Direct Injection. 90°V. V8.640 naturally aspirated, TV8.640 turbocharged.
Bore	4.63 in (118 mm) Nominal
Stroke	4.75 in (121 mm)
Cubic Capacity	640 in ³ (10,48 litres)
Compression Ratio —	
V8.640	16.25 : 1
TV8.640	14.95 : 1
Firing Order	1, 8, 7, 5, 4, 3, 6, 2.
Valve Tip Clearance	(Cold) 0.010 in (0,25 mm) Inlet 0.025 in (0,65 mm) Exhaust
Lubricating Oil Pressure	45 lbf/in ² (3,2 kgf/cm ²) or 310 kN/m ² minimum at maximum engine speed and normal operating tem- perature.
Sump Capacity	40 imp. pints (22,7 litres) 24 U.S. quarts (May vary with application — use indicated level on the dipstick with vehicle or machine on level ground).

Rating Details V8.640

Rated Output	215 bhp at 2600 rev/min
Maximum Torque	485 lbf ft (658 Nm) 67,1 kgf m at 1650 rev/min

TV8.640

Rated Output	250 bhp at 2600 rev/min
Maximum Torque	590 lbf ft (800 Nm) 81,6 kgf m at 1700 rev/min

Note: The above ratings are maximum ratings to BSAU141a : 1971 and can vary according to application. For details of individual ratings, apply to your nearest Perkins Distributor.

De-Rating for Altitude

If the engine is to operate continuously at altitudes higher than 5000 ft (1500 m), the fuel delivery should be reduced to minimise exhaust smoke and fuel consumption.

The reduced fuel delivery rate for operating at a particular altitude can be obtained through your Perkins Distributor providing that the information specified below is submitted.

Engine number, fuel injection pump type number and application into which engine is fitted.

Site barometric pressure, ambient temperature and humidity. If these are not available, specify altitude and location.

Whether or not the machine is working at a constant altitude or moving from one altitude to another.

Whether conventional gearbox or torque converter is fitted. If using a torque converter, give stall speed of transmission.

If possible, horsepower requirements of machine operating at site conditions.

Any alterations to fuel pump settings must be made by an authorised fuel pump specialist or Perkins Distributor.

Engine Weights (approximate)

Dry Bare Engine (includes alternator)

V8.640	1625 lb (737 kg)
TV8.640	1680 lb (762 kg)

Typical Installed Dry Engine (includes starter motor, flywheel and housing)

V8.640 Vehicle	1865 lb (846 kg)
V8.640 Ag. Tractor	2150 lb (975 kg)
TV8.640 Vehicle	1920 lb (871 kg)
TV8.640 Ag. Tractor	2200 lb (998 kg)

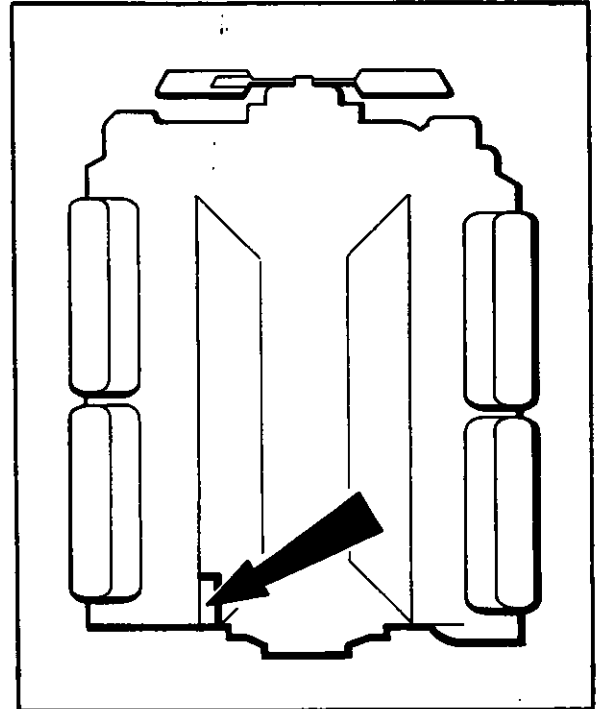
Note: Four lifting brackets are provided at the ends of the cylinder heads and these must all be used, preferably with a horizontal spreader bar. On no account should attempts be made to lift a V8.640 or TV8.640 engine using only two lifting brackets.

If, when lifting the engine, the lifting brackets are subjected to any shock loading, e.g. if the engine is allowed to fall several inches before being arrested by the lifting tackle, the brackets and bracket securing setscrews must be checked and renewed, if damaged in any way.

Engine Number

The engine number is stamped on a machined pad on the top of the inside rear end of the left bank of the cylinder block (Fig. B.1). The number consists of a combination of letters and figures. An example of an engine number in the earlier numbering system is 640UA1516 and in the current system is: ZA22698U510112E.

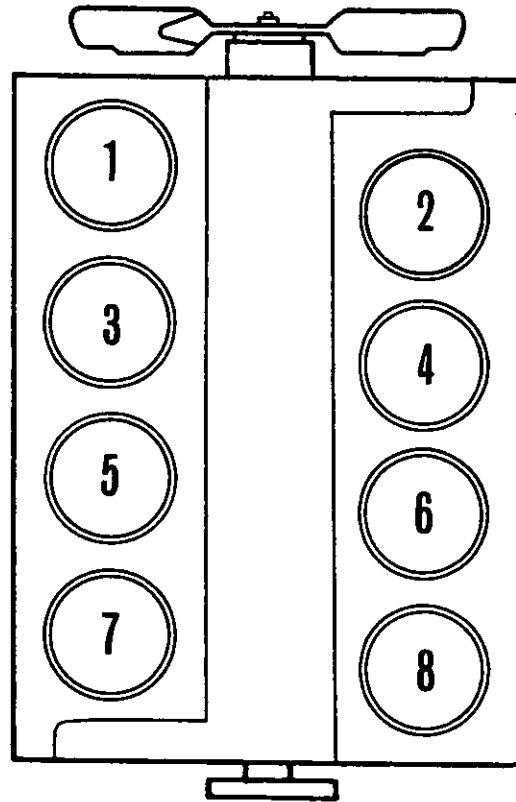
The full engine number should be quoted in the correct sequence when requesting information or ordering parts, together with the type of machine into which the engine is fitted.



TECHNICAL DATA—B.4

Cylinder Numbering

The cylinders are numbered from front to rear, No. 1 cylinder is at the front of the left bank, No. 2 is at the front of the right bank (see Fig. B.2).



B2

Recommended Torque Tensions

The following figures will apply with the components lightly oiled before assembly.

Securing Items	Torque		
	lbf ft	Nm	kgf m
Cylinder Head Setscrews ...	155	210	21,4
Cylinder Head Nuts ...	155	210	21,4
Big End Setscrews ...	105	142	14,5
Main Bearing Cap Setscrews ...	210	284	29,0
Main Bearing Cap Transverse Setscrews ...			
9/16 in U.N.F....	160	217	22,1
½ in U.N.F. ...	110	149	15,2
DP 15 Fuel Injection Pump Gear Capscrews ...	35	47	4,8
MW Fuel Injection Pump Gear Capscrews ...	37	50	5,1
Camshaft Gear Setscrews ...	40	54	5,5
Camshaft Thrust Plate Setscrews ...	12	16	1,7
Crankshaft/Camshaft Idler Gear Hub Retaining Setscrews ...	30	41	4,1
Camshaft/Fuel Pump Idler Gear Hub Setscrews ...	30	41	4,1
Crankshaft/Oil Pump Idler Gear Hub Setscrews ...	19	26	2,6
Crankshaft Pulley Retaining Setscrews (3 off)	65	88	9,0
Flywheel Setscrews ...	80	108	11,1
Water Pump Pulley Retaining Nut ...	70	95	9,7
Atomiser Clamp Retaining Nuts ...	35	47	4,8
Fuel Injection High Pressure Pipe Connections ...	15	20	2,1
Thermostart and Adaptor ...	10	14	1,4

TECHNICAL DATA—B.6

DATA AND DIMENSIONS

All threads used, except perhaps on proprietary equipment, are Unified Series and American Pipe Series. The following data of clearances and tolerances are mainly based upon those used in the factory for production. Unless specified otherwise, the information applies to both V8.640 and TV8.640 engines.

Cylinder Block

Height between Top Face of Cylinder Banks and Periphery of Main Bearing Parent Bore	11.967/11.9715 in (303,96/304,08 mm)
Depth of Recess for Cylinder Liner Flange	0.102/0.104 in (2,59/2,64 mm)
Dia. of Recess for Cylinder Liner Flange	4.992/4.996 in (126,80/126,90 mm)
Parent Bore Dia. for Cylinder Liner	4.8065/4.8075 in (122,09/122,11 mm)
Main Bearing Parent Bore Dia.	4.185/4.186 in (106,30/106,32 mm)
Camshaft Bush Parent Bore Dia. (No. 1)	2.6250/2.6262 in (66,68/66,71 mm)
Camshaft Bush Internal Dia.	2.4998/2.5020 in (63,49/63,55 mm)
Max. Permissible Worn Bush Internal Dia.	2.5045 in (63,61 mm)
Camshaft Bearing Bore Dia. No. 2... ..	2.3708/2.3724 in (60,22/60,26 mm)
Camshaft Bearing Bore Dia. No. 3... ..	2.3608/2.3624 in (59,96/60,00 mm)
Camshaft Bearing Bore Dia. No. 4... ..	2.3608/2.3624 in (59,71/59,75 mm)
Camshaft Bearing Bore Dia. No. 5... ..	2.2158/2.2174 in (56,28/56,32 mm)
Max. Permissible Wear on Camshaft Bearing Bores	0.002 in (0,05 mm)
Dia. of Bore for Tappet	0.75000/0.75125 in (19,05/19,08 mm)

Cylinder Liners

Type	Dry — Interference Fit (Production) — Slip Fit (Service)
Interference Fit of Production Liner in Cylinder Block Parent Bore	0.001/0.003 in (0,03/0,08 mm)
Transition Fit of Service Liner in Cylinder Block Parent Bore	0.001/0.001 in (0,03/0,03 mm)
Flange Thickness	0.104/0.106 in (2,64/2,69 mm)
Outside Dia. of Flange	4.970/4.973 in (126,24/126,31 mm)
Relationship of Top of Liner Flange to Top Face of Cylinder Block	0.000/0.004 in (0,00/0,10 mm) ABOVE
Height of Liner Above Top Face of Cylinder Block	0.024/0.030 in (0,61/0,76 mm)
Inside Dia. of Finished Production Liner in Cylinder Block	4.630/4.631 in (117,60/117,63 mm)
Inside Dia. of Pre-Finished Service Liner in Cylinder Block	4.631/4.632 in (117,63/117,65 mm)
Max. Permissible Worn Inside Dia. of Liner — New Rings Fitted	4.634 in (117,70 mm)
Max. Permissible Ovality of Worn Liner Bore	0.002 in (0,05 mm)

Pistons

Type	Toroidal Cavity in Crown, Inserted Top Ring Groove. TV8.640 pistons have larger combustion cavity than V8.640 pistons.
Piston Height in relation to Cylinder Block Top Face	0.0015/0.010 in (0,04/0,25 mm) ABOVE. Use 'H' or 'L' grade piston to suit. Fit slot in skirt to coincide with piston cooling jet.
Centre Line of Gudgeon Pin to Piston Crown	Grade H — 2.6985/2.6995 in (68,54/68,57 mm) Grade L — 2.6925/2.6935 in (68,39/68,41 mm)
Bore Dia. for Gudgeon Pin	1.7499/1.7501 in (44,447/44,453 mm)
Compression Ring Groove Width — Top	0.0973/0.0983 in (2,47/2,50 mm)
Compression Ring Groove Width — 2nd	0.0963/0.0973 in (2,45/2,47 mm)
Scraper Ring Groove Width	0.1895/0.1905 in (4,81/4,84 mm)

Piston Rings

Top Compression	...	...	...	...	Chromium, Barrel, Faced
2nd Compression	...	...	...	...	Chromium Faced, Internally Stepped
3rd and 4th Scraper	...	...	...	...	Chromium Faced, Coil Spring Loaded, Oil Control
Compression Ring Thickness	...	...	...	...	0.0930/0.0935 in (2,36/2,37 mm)
Scraper Ring Thickness	...	...	...	...	0.1860/0.1865 in (4,72/4,74 mm)
Compression Ring Clearance in Groove — Top	...	...	...	...	0.004/0.0055 in (0,10/0,14 mm)
Compression Ring Clearance in Groove — 2nd	...	...	...	...	0.003/0.0045 in (0,08/0,11 mm)
Scraper Ring Clearance in Groove	...	...	...	...	0.002/0.004 in (0,05/0,10 mm)
Max. Permissible Ring Clearance in Groove	...	...	...	...	0.008 in (0,20 mm)
Ring Gap — Top	...	...	...	...	0.013/0.029 in (0,33/0,74 mm)
Ring Gap — 2nd	...	...	...	...	0.018/0.031 in (0,46/0,79 mm)
Ring Gap — Scraper	...	...	...	...	0.013/0.034 in (0,33/0,86 mm)

Gudgeon Pins

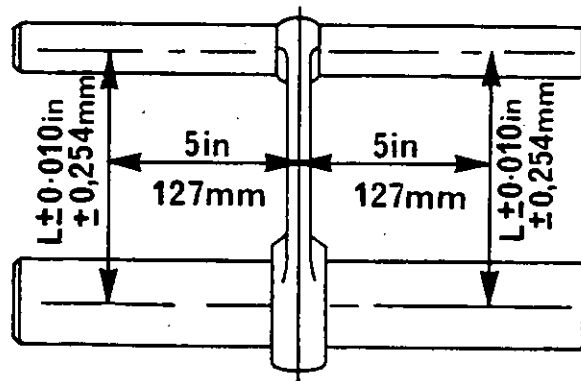
Type	...	...	...	...	Fully Floating
Outside Dia.	...	...	...	...	1.7498/1.7500 in (44,445/44,450 mm)
Transition Fit in Piston Boss	...	...	...	...	-0.0001/ +0.0003 in (-0,003/ +0,008 mm)
Clearance Fit in Small End Bush	...	...	...	...	0.0007/0.0018 in (0,018/0,046 mm)

Small End Bushes

Type	...	...	...	...	Steel Backed, Lead Bronze Lined
Interference Fit in Connecting Rod	...	...	...	...	0.002/0.0045 in (0,05/0,11 mm)
Inside Dia. after Reaming	...	...	...	...	1.7507/1.7516 in (44,47/44,49 mm)

Connecting Rods

Type	...	...	...	...	'H' Section
Cap Location to Connecting Rod	...	...	...	...	Saw Tooth
Big End Parent Bore Dia.	...	...	...	...	3.166/3.167 in (80,42/80,44 mm)
Small End Parent Bore Dia.	...	...	...	...	1.9375/1.9385 in (49,21/49,24 mm)
Big End Width	...	...	...	...	1.506/1.508 in (38,25/38,30 mm)
Big End Side Clearance on Crankshaft (Two Rods Fitted)	...	...	...	...	0.014/0.021 in (0,36/0,53 mm)
Length Between Bore Centres	...	...	...	...	8.999/9.001 in (228,57/228,63 mm)



B3

Connecting Rod Alignment

Large and small end bores must be square and parallel to each other within the limits of ± 0.010 in (0,25 mm), measured 5 in (127 mm) each side of the axis of the rod on test mandrel as shown in Fig. B.3. With the small end bush fitted, the limit of ± 0.010 in (0,25 mm) is reduced to ± 0.0025 in (0,064 mm).

Camshaft

No. 1 Journal Dia.	...	...	...	...	2.4965/2.4975 in (63,41/63,44 mm)
No. 2 Journal Dia.	...	...	...	...	2.3665/2.3675 in (60,11/60,13 mm)
No. 3 Journal Dia.	...	...	...	...	2.3565/2.3575 in (59,86/59,88 mm)
No. 4 Journal Dia.	...	...	...	...	2.3465/2.3475 in (59,60/59,63 mm)
No. 5 Journal Dia.	...	...	...	...	2.2115/2.2125 in (56,17/56,20 mm)
Max. Permissible Wear of Journals	...	...	...	...	0.001 in (0,03 mm)
Running Clearance — No. 1 Journal	...	...	...	...	0.0023/0.0055 in (0,06/0,14 mm)
Running Clearance — Remaining Journals	...	...	...	...	0.0033/0.0059 in (0,08/0,15 mm)
Max. Permissible Running Clearance	...	...	...	...	0.009 in (0,23 mm)
Cam Lift Inlet	...	...	...	...	0.3386/0.3416 in (8,60/8,68 mm)
Cam Lift — Exhaust	...	...	...	...	0.3456/0.3486 in (8,78/8,85 mm)
Camshaft End Float	...	...	...	...	0.0035/0.015 in (0,09/0,38 mm)
Max. Permissible Worn Camshaft End Float...	...	...	...	...	0.020 in (0,51 mm)
Oilways for Rocker Shaft Lubrication	...	...	...	...	Nos. 1 and 5 Journals

Camshaft Thrust Plate

Thickness	0.185/0.187 in (4,70/4,75 mm)
-----------	-----	-----	-----	-----	-------------------------------

Cylinder Heads

Cylinder Head Depth	...	...	...	...	3.985/4.015 in (101,22/101,98 mm)
Cylinder Head Skimming Allowance	...	...	...	...	0.015 in (0,38 mm) Max. providing nozzle protrusion does not exceed 0.143 in (3,63 mm) and head depth is not less than 3.970 in (100,84 mm) after skimming. Nozzle holes must be radiused after skimming.
Leak Test Pressure	...	...	...	...	30 lbf/in ² (207 kN/m ²) 2,11 kgf/cm ²
Valve Seat Angle	...	...	...	...	Early Heads 45° Current Heads Inlet 30° Exhaust 45°
Valve Guide Parent Bore Dia.	...	...	...	...	0.6247/0.6257 in (15,87/15,89 mm)

Valve Guides

Inside Dia.	...	...	...	...	0.375/0.376 in (9,53/9,55 mm)
Outside Dia.	...	...	...	...	0.626/0.6265 in (15,90/15,91 mm)
Interference Fit of Guide in Cylinder Head	...	...	...	...	0.0003/0.0018 in (0,008/0,046 mm)
Guide Protrusion above Spring Seating Face	...	...	...	...	0.516/0.536 in (13,11/13,61 mm)
Seal Dia. of Guide	...	...	...	...	0.555/0.569 in (14,10/14,45 mm)

Inlet Valves

Valve Stem Dia.	...	...	...	...	0.3725/0.3735 in (9,46/9,49 mm)
Clearance Fit of Valve in Guide	...	...	...	...	0.0015/0.0035 in (0,04/0,09 mm)
Max. Permissible Worn Clearance in Guide	...	...	...	...	0.0055 in (0,14 mm)
Valve Face Angle	...	...	...	...	Early 45° Current 30°
Valve Head Depth Below Cylinder Head Face	...	...	...	...	0.051/0.067 in (1,30/1,70 mm)
Max. Permissible Valve Head Depth (Service)	...	...	...	...	0.102 in (2,59 mm). Production figures to be used for engines conforming to BS AU 141a : 1971.
Overall Length	...	...	...	...	5.760/5.782 in (146,30/146,86 mm)
Sealing Arrangement	...	...	...	...	Spring Loaded Rubber Seal

Exhaust Valves

Valve Stem Dia.	...	...	...	...	0.372/0.373 in (9,45/9,47 mm)
Clearance Fit of Valve in Guide	...	...	...	...	0.002/0.004 in (0,05/0,10 mm)
Max. Permissible Worn Clearance in Guide	...	...	...	...	0.0055 in (0,14 mm)
Valve Face Angle	...	...	...	...	45°
Valve Head Depth Below Cylinder Head Face	...	...	...	...	0.041/0.057 in (1,04/1,45 mm)
Max. Permissible Valve Head Depth (Service)	...	...	...	...	0.097 in (2,46 mm). Production figures to be used for engines conforming to BS AU 141a : 1971
Overall Length	...	...	...	...	5.770/5.792 in (146,56/147,12 mm)
Sealing Arrangement	...	...	...	...	Spring Loaded Rubber Seal

TECHNICAL DATA—B.10

Inner Valve Springs

Fitted Length	...	...	...	...	1.273 in (32,33 mm)
Load at Fitted Length	...	...	...	...	31.0/34.4 lbf (138/153 N) 14,1/15,6 kgf
Coiled	...	...	...	...	Right Hand

Outer Valve Springs

Fitted Length	...	...	...	...	1.495 in (37,97 mm)
Load at Fitted Length	...	...	...	...	61.3/67.7 lbf (273/301 N) 27,8/30,7 kgf
Coiled	...	...	...	...	Left Hand

Rocker Shafts

Outside Dia. — Small Dia. Shaft	...	...	...	0.7485/0.7495 in (19,01/19,04 mm)
Outside Dia. — Large Dia. Shaft	...	...	...	0.8722/0.8734 in (22,15/22,18 mm)

Rocker Levers and Bushes — Small Dia. Shaft

Bore Dia. for Bush	...	...	...	0.875/0.8762 in (22,23/22,26 mm)
Interference Fit of Bush in Lever	...	...	...	0.0008/0.0035 in (0,02/0,09 mm)
Inside Dia. of Bush	...	...	...	0.7515/0.7537 in (19,09/19,14 mm)
Clearance of Bush on Rocker Shaft	...	...	...	0.0020/0.0052 in (0,05/0,13 mm)

Rocker Levers and Bushes — Large Dia. Shaft

Bore Dia. for Bush	...	...	...	1.0000/1.0012 in (25,40/25,43 mm)
Interference Fit of Bush in Lever	...	...	...	0.0008/0.003 in (0,02/0,08 mm)
Inside Dia. of Bush	...	...	...	0.8750/0.8772 in (22,23/22,28 mm)
Clearance of Bush on Shaft	...	...	...	0.0016/0.0050 in (0,04/0,13 mm)

Tappets

Tappet Shank Dia.	...	...	...	0.7475/0.7485 in (18,99 /19,01 mm)
Running Clearance in Block	...	...	...	0.0015/0.00375 in (0,04/0,10 mm)

Push Rods

Overall Length	...	...	...	11.748/11.832 in (298,40/300,53 mm)
Shank Dia.	...	...	...	0.313 in (7,95 mm)

Camshaft Gear

No. of Teeth	...	...	...	54
Inside Dia. of Camshaft Flange Location	...	...	...	1.9687/1.9703 in (50,00/50,05 mm)
Outside Dia. of Camshaft Flange	...	...	...	1.9678/1.9688 in (49,98/50,01 mm)
Transition Fit of Gear to Flange	...	...	...	+0.0025/—0.0001 in (+0,064/—0,003 mm)

Crankshaft Gear

No. of Teeth	...	...	...	27
Dia. of Bore	...	...	...	1.875/1.876 in (47,63/47,65 mm)
Outside Dia. of Crankshaft	...	...	...	1.8751/1.8757 in (47,63/47,64 mm)
Transition Fit of Gear to Crankshaft	...	...	...	+0.0009/—0.0007 in (+0,02/—0,02 mm)

Crankshaft/Camshaft Idler Gear and Hub

No. of Teeth	...	...	...	...	49
Parent Bore Dia. for Bush	...	...	...	...	2.4375/2.4387 in (61,91/61,94 mm)
Interference Fit of Bush in Gear	...	...	...	...	0.0026/0.0057 in (0,07/0,14 mm)
Inside Dia. of Bush — Fitted	...	...	...	...	2.2500/2.2522 in (57,15/57,21 mm)
Outside Dia. of Hub	...	...	...	...	2.2483/2.2490 in (57,11/57,12 mm)
Clearance Fit of Bush on Hub	...	...	...	...	0.0010/0.0039 in (0,03/0,10 mm)
Bearing Width of Gear	...	...	...	...	0.912/0.9135 in (23,16/23,20 mm)
Thrust Washer Thickness	...	...	...	...	0.110/0.115 in (2,79/2,92 mm)
Idler Gear End Float	...	...	...	...	0.0215/0.0250 in (0,55/0,64 mm)
Max. Permissible Worn Idler Gear End Float	...	...	...	...	0.035 in (0,89 mm)

Camshaft/Fuel Pump Idler Gear and Hub

No. of Teeth	...	...	...	...	40
Parent Bore Dia. for Bush	...	...	...	...	2.4375/2.4387 in (61,91/61,94 mm)
Interference Fit of Bush in Gear	...	...	...	...	0.0026/0.0057 in (0,07/0,14 mm)
Inside Dia. of Bush — Fitted	...	...	...	...	2.2500/2.2522 in (57,15/57,21 mm)
Outside Dia. of Hub	...	...	...	...	2.2483/2.2490 in (57,11/57,12 mm)
Clearance Fit of Bush on Hub	...	...	...	...	0.0010/0.0039 in (0,03/0,10 mm)
Bearing Width of Gear	...	...	...	...	0.9120/0.9135 in (23,16/23,20 mm)
Thrust Washer Thickness	...	...	...	...	0.110/0.115 in (2,79/2,92 mm)
Idler Gear End Float	...	...	...	...	0.0215/0.0250 in (0,55/0,64 mm)
Max. Permissible Worn Idler Gear End Float	...	...	...	...	0.035 in (0,89 mm)

Fuel Pump Drive Gear (DP 15 Pump)

No. of Teeth	...	...	...	...	54
Inside Locating Dia.	...	...	...	...	0.625/0.626 in (15,88/15,90 mm)
Shaft Spigot Dia.	...	...	...	...	0.6240/0.6247 in (15,85/15,87 mm)
Clearance Fit of Gear on Shaft	...	...	...	...	0.0003/0.0020 in (0,01/0,05 mm)

Fuel Pump Drive Gear (MW Pump)

No. of Teeth	...	...	...	...	54
Inside Locating Dia.	...	...	...	...	1.4961/1.4970 in (38,00/38,03 mm)
Shaft Spigot Dia.	...	...	...	...	1.4951/1.4957 in (37,98/37,99 mm)
Clearance Fit of Gear on Shaft	...	...	...	...	0.0004/0.0019 in (0,01/0,05 mm)

Timing Gear Backlash

All Gears	0.003 in (0,08 mm) minimum
-----------	-----	-----	-----	-----	----------------------------

Fuel Pump Drive Housing and Shaft (DP 15 Pump)

Parent Bore Dia. for Bush	...	...	...	...	2.5625/2.5643 in (65,09/65,13 mm)
Interference Fit of Bush in Housing	...	...	...	...	0.0025/0.0063 in (0,06/0,16 mm)
Inside Dia. of Bush — Finished in Situ	...	...	...	...	2.3750/2.3768 in (60,33/60,37 mm)
Journal Dia. of Shaft	...	...	...	...	2.3722/2.3735 in (60,25/60,29 mm)
Running Clearance of Shaft in Bush	...	...	...	...	0.0015/0.0046 in (0,04/0,12 mm)
Drive Shaft Thrust Plate Thickness	...	...	...	...	0.185/0.187 in (4,70/4,75 mm)
Drive Shaft End Float	...	...	...	...	0.006/0.010 in (0,15/0,25 mm)

Crankshaft/Oil Pump Idler Gear and Hub

No. of Teeth	...	...	...	...	33
Parent Bore Dia. for Bush	...	...	...	...	2.1875/2.1887 in (55,56/55,59 mm)
Interference Fit of Bush in Bore	...	...	...	...	0.002/0.0052 in (0,05/0,13 mm)
Inside Dia. of Bush — Fitted	...	...	...	...	2.000/2.0022 in (50,80/50,86 mm)
Outside Dia. of Hub	...	...	...	...	1.9981/1.9988 in (50,75/50,77 mm)
Clearance Fit of Bush on Hub	...	...	...	...	0.0012/0.0041 in (0,03/0,10 mm)
Width of Gear	...	...	...	...	0.880/0.882 in (22,35/22,40 mm)
Idler Gear End Float	...	...	...	...	0.015/0.022 in (0,38/0,56 mm)
Max. Permissible Worn Idler Gear End Float	...	...	...	...	0.032 in (0,81 mm)

TECHNICAL DATA—B.12

Lubricating Oil Pump Drive Gear

No. of Teeth	24
Bore Dia. for Drive Shaft... ..	0.7476/0.7484 in (18,99/19,01 mm)
Drive Shaft Dia.... ..	0.7490/0.7495 in (19,02/19,04 mm)
Interference Fit of Gear on Shaft	0.0006/0.0019 in (0,02/0,05 mm)

Lubricating Oil Pump

Type	Gear
No. of Driver Gears	1
No. of Driven Gears	2
Internal Dia. of Bushes for Driver Shaft Finished in Situ	0.7505/0.7520 in (19,06/19,10 mm)
Driver Shaft Journal Dia.... ..	0.7490/0.7495 in (19,02/19,04 mm)
Running Clearance of Driver Shaft in Bushes	0.001/0.003 in (0,03/0,08 mm)
Internal Dia. of Driven Gear Bushes Finished in Situ	0.6875/0.6885 in (17,46/17,49 mm)
Driven Gear Shaft Journal Dia.	0.686/0.6865 in (17,42/17,44 mm)
Running Clearance of Driven Gears on Shaft	0.001/0.0025 in (0,03/0,06 mm)
Radial Clearance between Gears and Pump Body	0.004/0.006 in (0,10/0,15 mm)
Max. Permissible Worn Radial Clearance	0.010 in (0,25 mm)
End Float of Pump Gears... ..	0.002/0.006 in (0,05/0,15 mm)
Max. Permissible End Float	0.010 in (0,25 mm)
Driver Gear to Driven Gear Backlash	0.024/0.039 in (0,61/0,99 mm)

Oil Pressure Relief Valve

Pressure Setting	60/65 lbf/in ² (414/448 kN/m ²) 4,2/4,6 kgf/cm ²
Outside Dia. of Plunger	0.873/0.874 in (22,17/22,20 mm)
Bore Dia. of Valve Housing	0.875/0.876 in (22,23/22,25 mm)
Clearance of Plunger in Bore	0.001/0.003 in (0,03/0,08 mm)
Load at 2.600 in (66,04 mm) Spring Length	35/37 lbf (156/165 N) 15,9/16,8 kgf

Lubricating Oil Dump Valve

Type	Spring Loaded Ball
Pressure Setting	180 lbf/in ² (1241 kN/m ²) 12,7 kgf/cm ²
Load at 2.667 in (67,74 mm) Spring Length	67/71 lbf (298/316 N) 30,4/32,2 kgf

Piston Cooling Oil Control Valve

Pressure Setting	40 lbf/in ² (276 kN/m ²) 2,81 kgf/cm ²
Plunger Dia.	0.3978/0.3988 in (10,10/10,13 mm)
Bore Dia. of Valve Housing	0.400/0.401 in (10,16/10,19 mm)
Clearance of Plunger in Bore	0.0012/0.0032 in (0,03/0,08 mm)
Load at 1.47 in (37,34 mm) Spring Length	4.58/4.88 lbf (20/22 N) 2,1/2,2 kgf

Lubricating Oil Filter

Type	Full Flow
Element Type	Renewable Canister
By-Pass Valve Setting	8/12 lbf/in ² (55/83 kN/m ²) 0,56/0,84 kgf/cm ²

Oil Cooler

Make	Serck
By-Pass Valve Setting	25 lbf/in ² (172 kN/m ²) 1,8 kgf/cm ²
Leak Test Air Pressure — Oil Side	60 lbf/in ² (414 kN/m ²) 4,2 kgf/cm ²
Leak Test Air Pressure — Water Side	30 lbf/in ² (207 kN/m ²) 2,11 kgf/cm ²

Cooling System

Type	Water Pump Circulation
Engine Coolant Capacity	50 Imperial pints (28,4 litres)
	30 U.S. quarts

Thermostats

Type	Wax Capsule, By-Pass Blanking
Opening Temperature	79/83°C (174/181°F)
Fully Open Temperature	93/96°C (199/205°F)
Valve Travel	0.374/0.500 in (9,53/12,70 mm)

Water Pump

Type	Centrifugal
Outside Dia. of Main Shaft for Pulley	1.1242/1.1247 in (28,55/28,57 mm)
Dia. of Pulley Bore	1.1250/1.1258 in (28,58/28,60 mm)
Clearance Fit of Pulley on Shaft	0.0003/0.0016 in (0,01/0,04 mm)
Inside Dia. of Main Shaft... ..	0.625/0.6257 in (15,88/15,89 mm)
Dia. of Impeller Bore	0.625/0.6257 in (15,88/15,89 mm)
Outside Dia. of Impeller Shaft	0.6260/0.6263 in (15,90/15,91 mm)
Interference Fit of Impeller Shaft in Main Shaft and Impeller	0.0003/0.0013 in (0,01/0,03 mm)
Impeller Protrusion above Water Pump Body Rear Face	0.015/0.020 in (0,38/0,51 mm)

Approved Fuel Oil Specifications

United Kingdom	BS2869:1967 — Class A1 and A2
United States	A.S.T.M./D.975-66T — Nos. 1-D or 2-D
	VV-F-800a: Grades DF-A, DF-1 or DF-2
Germany	DIN — 51601 (1967)
France... ..	(J.O.14/9/57) Gas Oil or Fuel Domestique
Italy	CUNA — Gas Oil NC-630-01 (1957)
India	IS:1460/1968 — Grade Special or Grade A
Sweden	SIS. 15 54 32 (1969)
Switzerland	Federal Military Specification 9140 - 335 - 1404 (1965)

Fuel oils available in territories other than those listed above which are to an equivalent specification may be used.

Fuel Lift Pump (for DP15 Fuel Pump)

Type	AC Delco 'Z' Type
Method of Drive	Eccentric Fuel Injection Pump Drive Shaft
Stall Pressure	26/36 lbf/in ² (179/248 kN/m ²) 1,83/2,53 kgf/cm ²
Operating Pressure	10 lbf/in ² (69 kN/m ²) 0,70 kgf/cm ²

Fuel Lift Pump Operating Rod

Diameter	0.2964/0.2969 in (7,53/7,54 mm)
Length	1.249/1.251 in (31,72/31,78 mm)

Fuel Filter

Type	Twin Element, Parallel Flow
-------------	-----------------------------

Fuel Injection Pump

Make and Type	C.A.V. DP15 or Bosch MW
Pump Rotation	Clockwise (from drive end)
DP15 Static Timing	16° B.T.D.C.
Engine Checking Angle (for DP15 pump using tool MS67B)	312°

TECHNICAL DATA—B.14

Atomisers — TV8.640

Code Letters	Holder	Nozzle	Setting Pressure	Working Pressure
VR	2646561 (OKLL54S2965)	2646864 (OLL150S3385)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
VX	2646561 (OKLL54S2965)	2646868 (OLL150S7777)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
VY	2646566 (OKLL54S2924)	2646868 (OLL150S7777)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WA	2646566 (OKLL54S2924)	2646864 (OLL150S3385)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WK	2646551 (OKLL54S3014)	2646864 (OLL150S3385)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WL	2646551 (OKLL54S3014)	2646868 (OLL150S7777)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WP	2645C301 (OKLL54S3052)	2646864 (OLL150S3385)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (210 kgf/cm ²) 2870 lbf/in ²

Atomisers — V8.640

Code Letters	Holder	Nozzle	Setting Pressure	Working Pressure
VT	2646561 (OKLL54S2965)	2646867 (OLL150S7604)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
VZ	2646566 (OKLL54S2924)	2646870 (OLL150S7788)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WD	2646569 (OKLL54S2996)	2646867 (OLL150S7604)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WJ	2646551 (OKLL54S3014)	2646870 (OLL150S7788)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²
WU	2646553 (OKLL54M3059)	2646874 (OLL150M8388)	250 atm (258 kgf/cm ²) 3670 lbf/in ²	235 atm (243 kgf/cm ²) 3450 lbf/in ²
WV	2645C301 (OKLL54S3052)	2646870 (OLL150S7788)	210 atm (217 kgf/cm ²) 3090 lbf/in ²	195 atm (201 kgf/cm ²) 2870 lbf/in ²

Turbocharger

Make and Type ...	...	...	...	Airesearch T-04B or Holset H2B
Boost Pressure ...	...	...	...	9/11 lbf/in ² (62/76 kN/m ²) 0,63/0,77 kgf/cm ² at 2500 rev/min Full load

WB 15 Compressor

Make ...	...	...	...	Bendix Westinghouse
Rating ...	...	...	...	31,1 ft ³ /min (0,88 m ³ /min) at 2000 rev/min
Cylinder Bore Dia.	...	...	...	2.9527/2.9537 in (75,00/75,02 mm)
Max. Permissible Worn Bore Dia.	...	...	...	2.961 in (75,21 mm)
Clearance of Piston Skirt in Bore	...	...	...	0.003/0.0045 in (0,08/0,11 mm)
Clearance of Piston Rings in Grooves	...	...	...	0.0005/0.0025 in (0,01/0,06 mm)
Ring Gap in Unworn Cylinder — Top	...	...	...	0.004/0.013 in (0,10/0,33 mm)
Ring Gap in Unworn Cylinder — Second	...	...	...	0.003/0.010 in (0,08/0,11 mm)
Ring Gap in Unworn Cylinder — Scraper	...	...	...	0.005/0.013 in (0,13/0,33 mm)
Crankpin Dia.	...	...	...	1.1872/1.1875 in (30,15/30,16 mm)
Big End Running Clearance	...	...	...	0.0015/0.0037 in (0,04/0,09 mm)
Max. Permissible Worn Big End Running Clearance	...	...	...	0.0045 in (0,11 mm)
Main Bearing Running Clearance	...	...	...	0.0009/0.0028 in (0,02/0,07 mm)
Max. Permissible Worn Main Bearing Running Clearance	...	...	...	0.0035 in (0,09 mm)
Gudgeon Pin Dia.	...	...	...	0.6248/0.6250 in (15,870/15,875 mm)
Small End Running Clearance	...	...	...	0.0001/0.0007 in (0,003/0,018 mm)
Max. Permissible Worn Small End Clearance	...	...	...	0.0015 in (0,04 mm)

Tu-Flo 600 Compressor

Make ...	...	...	...	Bendix Westinghouse
Swept Volume ...	...	...	...	23 ft ³ /min (0,65 m ³ /min) at 2000 rev/min
Clearance of Piston Rings in Groove	...	...	...	0.0015/0.003 in (0,04/0,08 mm)
Ring Gap in Unworn Cylinder	...	...	...	0.005/0.015 in (0,13/0,38 mm)



Download the full PDF manual instantly.

Our customer service e-mail:

aservicemanualpdf@yahoo.com