

Chapter Thirty-eight

TABLE OF FITS AND CLEARANCES

Ghost 48 Mk. 1—Issue No. 12 February 1958 Ghost 48 Mk. 2—Issue No. 11 February 1958

Contents	
	Page
Air-intake (Ghost 48 Mk. 1)	2
Air-intake (Ghost 48 Mk. 2)	56
Centre housing	5
Combustion chamber (type 4)	47
Combustion chamber (type 5)	51
Exhaust system (pre-mod. 187)	42
Exhaust system (mod. 187, 290, 362, and 540)	44
Fuel control valves (Ghost 48 Mk. 1)	46
Hydraulic pump drive (Ghost 48 Mk. 1, in Sea Venom only)	54
Impeller vane and front bearing (Ghost 48 Mk. 1)	28
Impeller vane and front bearing (Ghost 48 Mk. 2)	74
Oil sump (Ghost 48 Mk. 1)	26
Oil sump (Ghost 48 Mk. 2)	66
Turbine disc and rear bearing	32
Wheelcase bottom (Ghost 48 Mk. 1)	20
Wheelcase top (Ghost 48 Mk. 1)	8
Wheelcase top, alternative, (Ghost 48 Mk. 1)	15
Wheelcase top (Ghost 48 Mk. 2)	58

Illustrations	
Fig.	Fig.
Air-intake (Ghost 48 Mk. 1)	1
Air-intake, alternative (Ghost 48 Mk. 1)	1a
Centre housing (Ghost 48 Mk. 1)	2
Wheelcase top (Ghost 48 Mk. 1)	3
Wheelcase top, alternative (Ghost 48 Mk. 1)	3a
Wheelcase bottom, pre-mod. 383 (Ghost 48 Mk. 1)	4
Wheelcase bottom, mod. 383 (Ghost 48 Mk. 1)	4a
Oil sump (Ghost 48 Mk. 1)	5
Impeller vane and front bearing (Ghost 48 Mk. 1) pre-mod. 897 and 916	6
Impeller vane and front bearing (Ghost 48 Mk. 1) mod. 897 and 916	7
Turbine disc and rear bearing	8
Exhaust system, pre-mod. 187	9
Exhaust system, mod. 187, 290, 362, and 540	9a
Fuel control valves (Ghost 48 Mk. 1)	10
Combustion chamber, pre-mod. 293 (type 4)	11
Combustion chamber, mod. 293, pre-mod. 437 (type 4)	11a
Combustion chamber, mod. 437, 712, 722, 743, 901, 987, and 1113 (type 5)	11b
Hydraulic pump drive (Ghost 48 Mk. 1, in Sea Venom only)	11c
Air-intake (Ghost 48 Mk. 2)	12
Top wheelcase (Ghost 48 Mk. 2)	13
Oil sump (Ghost 48 Mk. 2)	14
Impeller vane and front bearing (Ghost 48 Mk. 2) pre-mod. 897 and 916	15
Impeller vane and front bearing (Ghost 48 Mk. 2) mod. 897 and 916	16

THIS CHAPTER is applicable to both the Ghost 48 Mk. 1 and 48 Mk. 2. Where information is applicable to one mark of engine only the text is suitably endorsed.

When inspecting and reassembling this engine during overhaul or repair, the dimensions, clearances and repair tolerances given in this chapter should be adhered to strictly. The data regarding fits and clearances are specified under four headings, i.e. "New Dimensions", "Permissible Worn Dimensions", "New Clearances", and "Permissible Worn Clearances". All dimensions are given in inches and decimals of an inch except where specified.

Where a dimension is qualified as being for "engines in service", or where a different value is quoted in chapters 5 to 20, that dimension or value is applicable only at routine inspection during servicing or maintenance, and is intended only to permit the engine to run until the next inspection period. It will be appreciated that, in order to avoid unnecessary rejections of engines in service, a little more latitude is permissible during maintenance between overhauls than would be good practice during complete overhaul.

The figures in the column "New Dimensions", are the drawing sizes to which parts are made. These dimensions are given in limit form and represent the minimum and maximum sizes to which parts may be accepted when new; for example, $\frac{0.7475}{0.7485}$ for the diameter of a shaft.

The difference between the minimum and maximum dimensions quoted in para. 2 is known as the manufacturing tolerance. This tolerance is necessary as an aid to manufacture and its numerical value is an expression of the accuracy required by the design; it may also be considered as a numerical expression of the desired quality of workmanship. For the example referred to in para. 2 the tolerance is 0.001.

The dimensions in the column "Permissible Worn Dimensions" represent the limits of size to which parts may be worn and still be fitted for a further period of service. These dimensions have been so fixed that the components are fit for the full period of further service that is normally permitted. When however, during reconditioning, parts are found to be worn beyond the limits laid

down, they must be classified as unserviceable, unless they can be restored to a serviceable condition by one of the approved repair schemes.

In the column "New Clearances", are given the minimum and maximum working clearances obtainable with new parts when assembled together; these are functions of the minimum and maximum sizes of mating parts given in the "New Dimensions" column. For example, if a new shaft made to the minimum size 0.7475 is assembled with a new bush having a bore to the maximum size 0.7505, the resulting working clearance will be 0.003; similarly, if a new shaft to the maximum size 0.7485 is assembled with a bush to the minimum size 0.7500, the resulting working clearance will be 0.0015.

The "Permissible Worn Clearances" are the limits of working clearance permissible between any two parts assembled together for a further period of service (para. 4). If a male member worn to the minimum size is assembled with a corresponding new female part machined to the minimum drawing limit, the resulting working clearance between the two parts will, in most

instances, correspond with the maximum permissible worn clearance. Similarly, if a female part worn to the maximum permissible size is assembled with a corresponding male part machined to the maximum drawing limit, the resulting working clearance will be the same. Consider the following example:—

New bush having bore to minimum drawing limit	0.7500
Shaft worn to permissible size	0.7450
Resulting clearance	0.005
Bush worn to permissible size	0.7535
New shaft to maximum drawing limit.. .	0.7485
Resulting clearance	0.005

A diagram is included for each main assembly to assist in locating points on the assembly at which wear is likely to occur. The numbers in the diagram relate to the reference numbers in column (1) of the schedule.

Air-Intake (Ghost 48 Mk. 1) (Fig. 1 and Fig. 1a — Alternative)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Upper Driving Gear (Starter) in Bush					
	Bush—bore	$\frac{2.2500}{2.2505}$	2.2535	$\frac{0.0025}{0.0035}$	0.006	
	Gear shank—outside diameter	$\frac{2.2470}{2.2475}$	2.244			
2	Upper Driving Gear (Starter)					
	End float	—	—	$\frac{0.008}{0.017}$	0.022	
3	Vertical Driving Shaft in Starter Dog, Serration Backlash					
	Starter dog serrations—dimension between parallel faces	$\frac{0.7038}{0.7053}$	0.711	$\frac{0.0008}{0.0055}$	0.008	
	Driving shaft serrations—dimension over parallel faces	$\frac{0.6998}{0.7030}$	0.6958			

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
4	Ball Bearings in Lower Gear Bearing Housing Bearing housing—bore	$\frac{2.0471}{2.0476}$	2.0486	$\frac{-0.0002}{+0.0009}$	+0.0013	
		$\frac{51,995 \text{ mm.}}{52,008 \text{ mm.}}$				
	Ball bearing—outside diameter	$\frac{2.0467}{2.0473}$	2.0458	$\frac{-0.005 \text{ mm.}}{+0.021 \text{ mm.}}$	+0.033 mm	
		$\frac{51,987 \text{ mm.}}{52,000 \text{ mm.}}$				
		51,962 mm.				

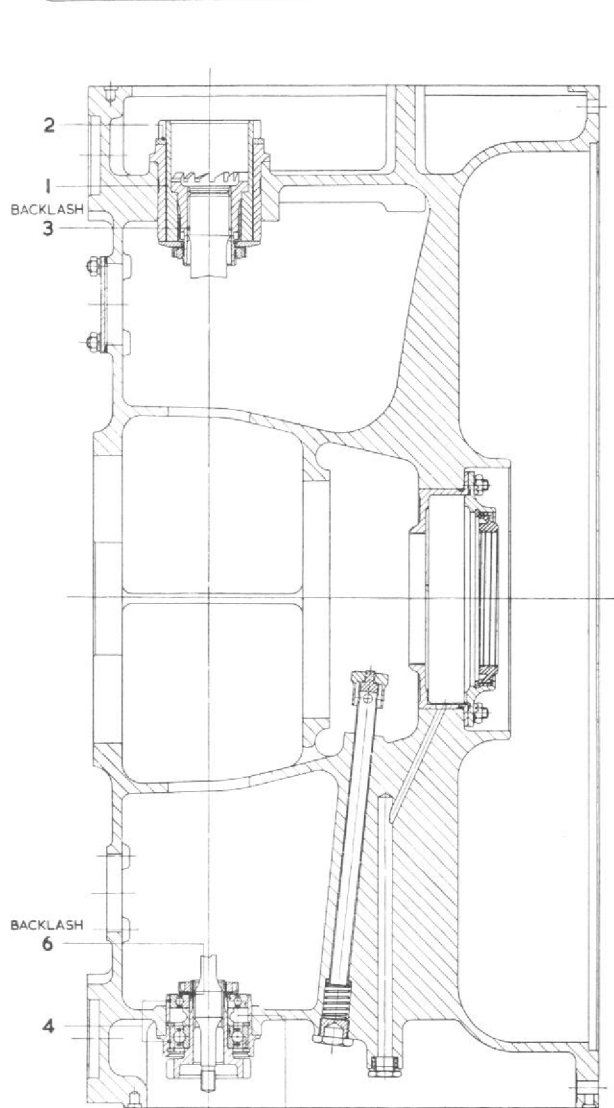


Fig. 1 Air-intake
(Ghost 48 Mk. 1). 5

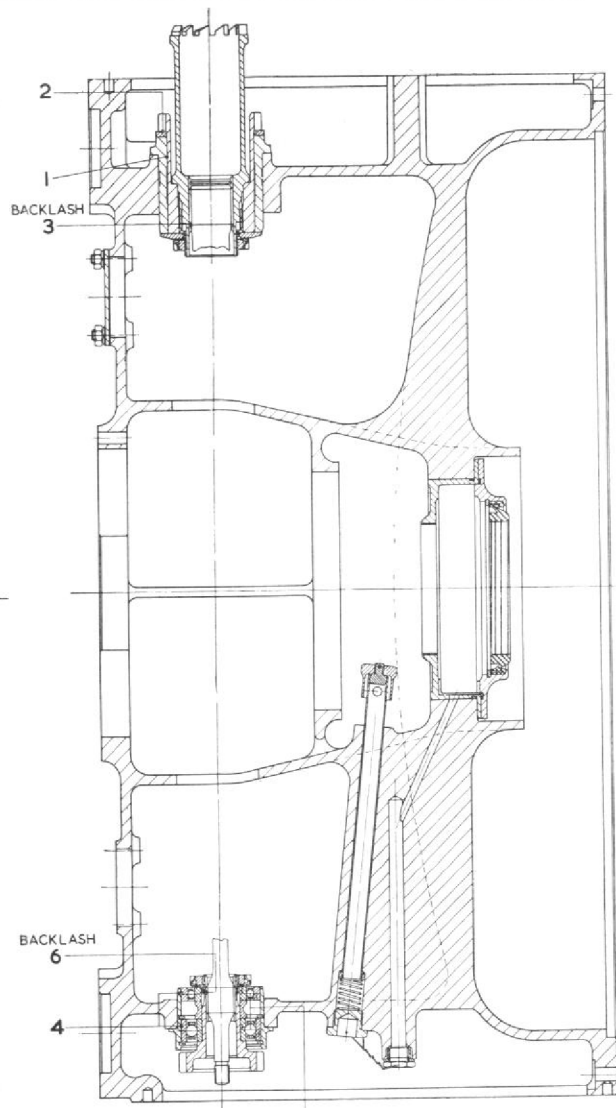


Fig. 1a (alternative). Air-intake
(Ghost 48 Mk. 1). 5

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
5	Lower Gear Ball Bearings					
	End float between inner and outer races	—	—	0.005 0.002 0.004	0.007 0.006	Hoffman types No. 125 or 125.V2 and L25N or L25N.V2 Ransome and Marles types LJ25 and KLNJ25
6	Vertical Driving Shaft in Lower Driving Gear, Serration Backlash					
	Driving gear serrations—dimension between parallel faces	0.4577 0.4589	0.4641	0.0006 0.0044	0.007	
	Driving shaft serrations—dimension over parallel faces	0.4545 0.4571	0.4507			

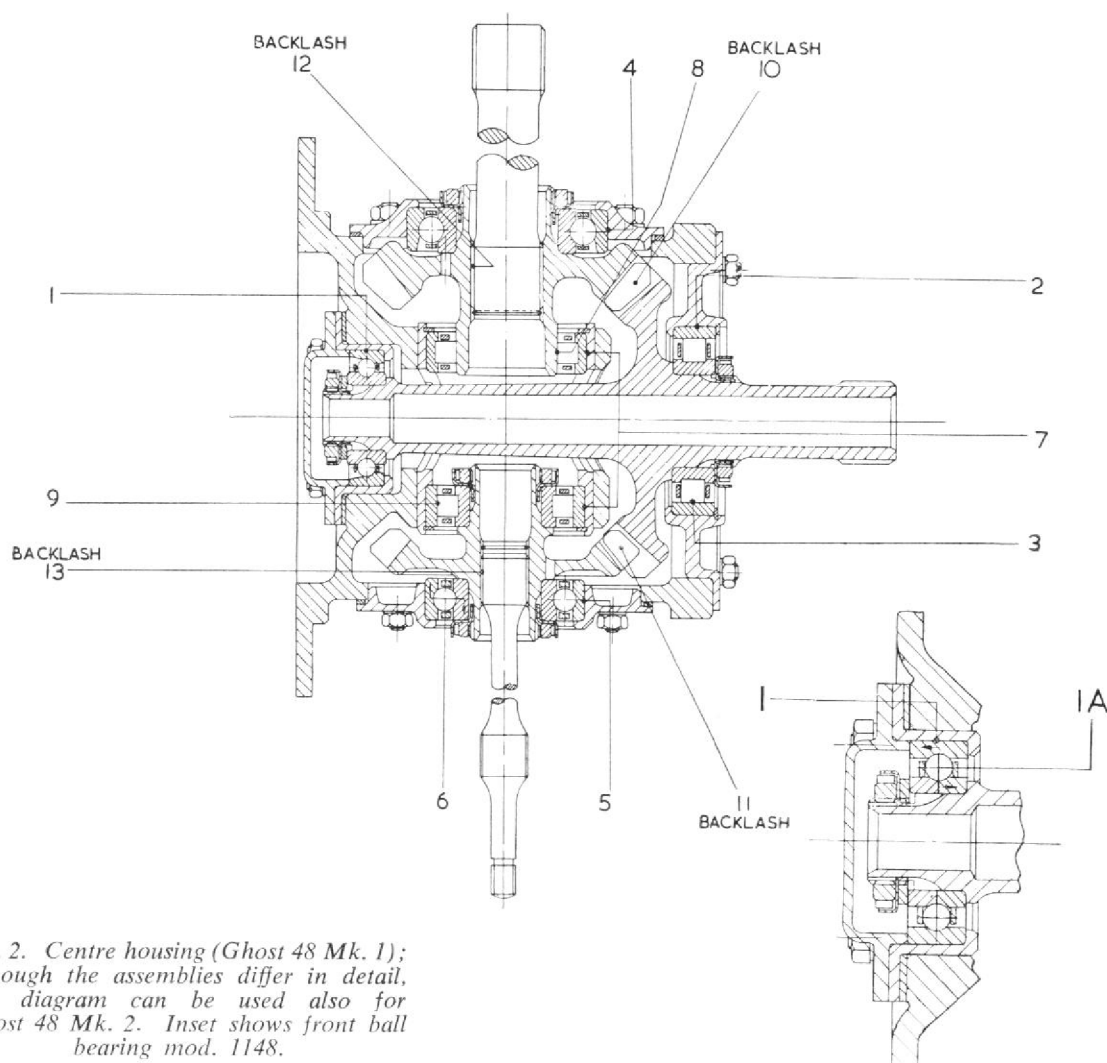


Fig. 2. Centre housing (Ghost 48 Mk. 1); although the assemblies differ in detail, this diagram can be used also for Ghost 48 Mk. 2. Inset shows front ball bearing mod. 1148.

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April, 1958

Centre Housing (Fig. 2)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
1	Front Bearing in Bearing Housing					
	Bearing housing—bore	$\frac{2.0471}{2.0476}$	—			
		$\frac{51,995 \text{ mm.}}{52,008 \text{ mm.}}$	—	$\frac{-0.0002}{+0.0009}$		
	Ball bearing—outside diameter	$\frac{2.0467}{2.0473}$	—	$\frac{-0.005 \text{ mm.}}{+0.021 \text{ mm.}}$	Not permitted	
		$\frac{51,987 \text{ mm.}}{52,000 \text{ mm.}}$	—			
1a	Front bearing End float between inner and outer races	—	—	$\frac{0.002}{0.005}$	0.007	Mod. 1148 only
2	Rear Roller Bearing in Bearing Housing					
	Bearing housing—bore	$\frac{2.8345}{2.8350}$	2.836			
		$\frac{71,995 \text{ mm.}}{72,008 \text{ mm.}}$	72,033 mm.	$\frac{-0.0002}{+0.0008}$	+0.0013	
	Roller bearing—outside diameter	$\frac{2.8342}{2.8347}$	2.8332	$\frac{-0.005 \text{ mm.}}{+0.021 \text{ mm.}}$	+0.033 mm.	Pre-mod 313, applicable to Ghost 48 Mk. 1 only
		$\frac{71,987 \text{ mm.}}{72,000 \text{ mm.}}$	71,962 mm.			
	Bearing housing—bore	$\frac{2.8335}{2.8340}$	—			
		$\frac{71,971 \text{ mm.}}{71,984 \text{ mm.}}$	—	$\frac{-0.0012}{-0.0002}$	Not permitted	
	Roller bearing—outside diameter	$\frac{2.8342}{2.8347}$	—	$\frac{-0.029 \text{ mm.}}{-0.003 \text{ mm.}}$		Mod. 313 (Ghost 48 Mk. 1), and Ghost 48 Mk. 2
		$\frac{71,987 \text{ mm.}}{72,000 \text{ mm.}}$	—			
3	Rear Roller Bearing					
	Diametral clearance between rollers and outer race	—	—	$\frac{0.0013}{0.0018}$	0.0025	Hoffman type R.135 or R.135V3M*
				$\frac{0.0008}{0.0012}$	0.002	Ransome and Marles type LRJ35
						*At engine reconditioning, if the existing roller bearing is to be replaced by the original Hoffman type R.135, it must be supplied with a yellow anti-friction metal cage. (Mod. 1141).

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
4	Top Vertical Gear Angular Contact Bearing in Bearing Housing					
	Bearing housing—bore	$\frac{3.1495}{3.1500}$	—			
		$\frac{79,997 \text{ mm.}}{80,010 \text{ mm.}}$	—	$\frac{-0.0001}{+0.0009}$		
	Ball bearing—outside diameter	$\frac{3.1491}{3.1496}$	—	$\frac{-0.003 \text{ mm.}}{+0.023 \text{ mm.}}$	Not permitted	Hoffman type ball bearing F.615
		$\frac{79,987 \text{ mm.}}{80,000 \text{ mm.}}$	—			
	Bearing housing—bore	$\frac{3.1495}{3.1500}$	—			
		$\frac{79,997 \text{ mm.}}{80,010 \text{ mm.}}$	—	$\frac{-0.0001}{+0.0007}$	Not permitted	Ransome and Marles type ball bearing L.P.40
	Ball bearing—outside diameter	$\frac{3.1493}{3.1496}$	—	$\frac{-0.003 \text{ mm.}}{+0.018 \text{ mm.}}$		
		$\frac{79,992 \text{ mm.}}{80,000 \text{ mm.}}$	—			
5	Bottom Vertical Gear Ball Bearing in Bearing Housing					
	Bearing housing—bore	$\frac{2.4993}{2.4998}$	—	$\frac{-0.0002}{+0.0008}$	Not permitted	
	Ball bearing—outside diameter	$\frac{2.4990}{2.4995}$	—			
6	Bottom Vertical Gear Ball Bearing			$\frac{0.0045}{0.0070}$	0.010	Hoffman type LS.11 or LS.11.V2
	End float	—	—	$\frac{0.005}{0.007}$	0.010	Ransome and Marles type LJ.1 $\frac{1}{8}$
7	Top and Bottom Vertical Gear Roller Bearings in Housing Sleeve					
	Housing sleeve—bore	$\frac{2.4993}{2.4998}$	2.5008	$\frac{-0.0002}{+0.0008}$	+0.0013	Pre-mod. 313, applicable to Ghost 48 Mk. 1 only
	Roller bearing—outside diameter	$\frac{2.4990}{2.4995}$	2.498			
	Housing sleeve—bore	$\frac{2.4983}{2.4988}$	—	$\frac{-0.0012}{-0.0002}$	Not permitted	Mod. 313 (Ghost 48 Mk. 1), and Ghost 48 Mk. 2
	Roller bearing—outside diameter	$\frac{2.4990}{2.4995}$	—			

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
8	Top Vertical Gear Journal in Roller Race Journal—diameter	$\frac{1.5615}{1.5620}$	1.560	—	—	
9	Bottom Vertical Gear Roller Bearing Diametral clearance between rollers and outer race	—	—	$\frac{0.0013}{0.0018}$ $\frac{0.0008}{0.0012}$	0.0025 0.002	Hoffman type RLS.11 or RLS.11V3M* Ransome and Marles type LRJ.1 $\frac{1}{8}$ *At engine re-conditioning if the existing roller bearing is to be replaced by the original Hoffman type RLS.11, it must be supplied with a yellow anti-friction metal cage. (Mod. 1141).
10	Horizontal and Upper Vertical Bevel Gears Backlash between horizontal driving gear and upper vertical bevel gear	—	—	$\frac{0.009}{0.019}$	0.024	Adjustable by means of the following adjusting washers:— One washer situated beneath top (and bottom) vertical bevel gear bearing housing flanges 0.096 and 0.063 nominal thickness respectively in 0.003 thick shims.
11	Horizontal and Lower Vertical Bevel Gears Backlash between horizontal driving gear and lower vertical bevel gear	—	—	$\frac{0.009}{0.018}$	0.023	One washer situated beneath flange of front bearing housing 0.063 nominal thickness in 0.003 thick shims. Alternative adjusting washers may be half-solid, half laminum shims in 0.001 increments.
12	Upper Vertical Driving Shaft in Bevel Gear, Serration Backlash Bevel gear serrations—dimension between parallel faces Driving shaft serrations—dimension over parallel faces	$\frac{0.7038}{0.7053}$ $\frac{0.6998}{0.7030}$	0.711 0.6958	$\frac{0.0008}{0.0055}$	0.008	
13	Lower Vertical Driving Shaft in Bevel Gear, Serration Backlash Bevel gear serrations—dimension between parallel faces Driving shaft serrations—dimension over parallel faces	$\frac{0.4577}{0.4589}$ $\frac{0.4545}{0.4571}$	0.4641 0.4507	$\frac{0.0006}{0.0044}$	0.007	

Wheelcase Top (Ghost 48 Mk. 1) (Fig. 3)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Compressor Drive Gear Flange in Bush					
	Bush—bore	$\frac{0.9375}{0.9380}$	0.941	$\frac{0.0015}{0.0025}$	0.005	
	Gear flange shank—outside diameter	$\frac{0.9355}{0.9360}$	0.9325			
2	Compressor Drive Gear End float	—	—	$\frac{0.004}{0.015}$	0.020	Measured with the wheelcase bolted to the air-intake.
3	Compressor Drive Quillshaft in Spur Gear and Sleeve, Spline Backlash					
	Gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Quillshaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
4	Compressor Driving Shaft in Bevel Gear and Sleeve, Spline Backlash					
	Gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Shaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
5	Compressor Housing and Adapter Bevel Gears in Bushes					
	Bush—bore	$\frac{0.6875}{0.6880}$	0.6905	$\frac{0.0015}{0.0025}$	0.0045	
	Bevel gear shank—outside diameter	$\frac{0.6855}{0.6860}$	0.683			
6	Compressor Housing Bevel Gear End float	—	—	$\frac{0.0027}{0.0256}$	0.036	The end float is measured as the clearance between the washer and the housing as indicated on Fig. 3.
6a	Compressor Adapter Bevel Gear End float	—	—	$\frac{0.0026}{0.0306}$	0.040	The end float is measured as the clearance between the washer and the adapter, as indicated on Fig. 3.

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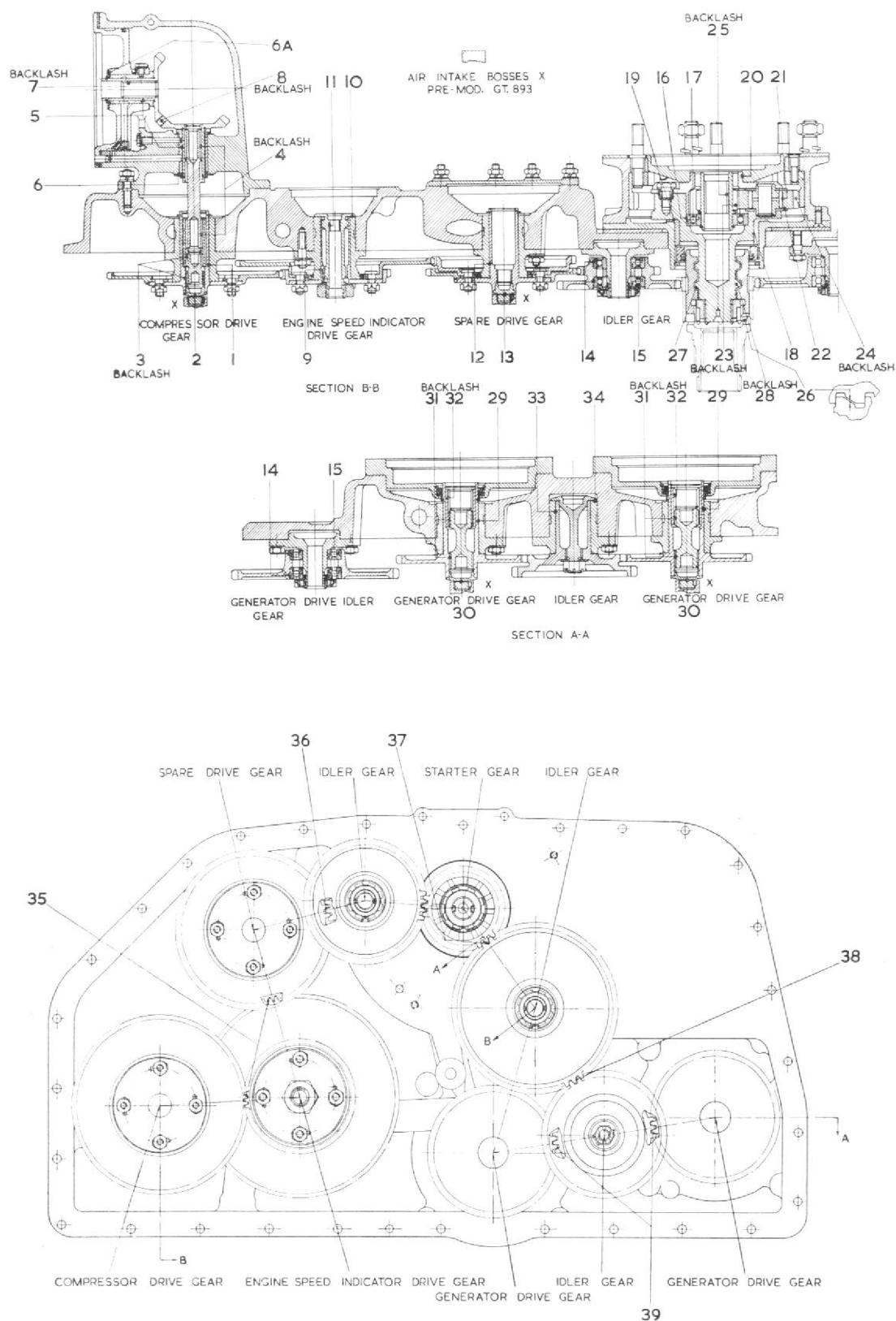


Fig. 3. Wheelcase top (Ghost 48 Mk. 1).

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Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
7	Compressor Shaft in Adapter Bevel Gear Gear—width of spline- ways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
8	Bevel Gears Backlash	—	—	$\frac{0.005}{0.011}$	0.015	Adjustable by means of the following shims:— One situated beneath the compressor adapter flange and another beneath the compressor housing bush flange, both 0.060 nomin- al thickness, half solid and half shims or all laminated in 0.002 or 0.003 increments.
9	Engine Speed Indicator Drive Gear in Bush Bush-bore Gear shank—outside diameter	$\frac{0.9375}{0.9380}$ $\frac{0.9355}{0.9360}$	0.941 0.9325	$\frac{0.0015}{0.0025}$	0.005	
10	Engine Speed Indicator Drive Gear, End Float Gear flange shank— length Bush—length over thrust faces	$\frac{2.025}{2.027}$ $\frac{2.019}{2.021}$	2.033 2.013	$\frac{0.004}{0.008}$	0.012	
11	Engine Speed Indicator Shaft in Gear Retain- ing Bolt Bolt serrations—dimen- sion between parallel faces	$\frac{0.2208}{0.2217}$	0.2263	—	—	
12	Spare Drive Gear Flange in Bush Bush—bore Gear flange shank—out- side diameter	$\frac{0.9375}{0.9380}$ $\frac{0.9355}{0.9360}$	0.941 0.9325	$\frac{0.0015}{0.0025}$	0.005	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
13	Spare Drive Gear End float	—	—	$\frac{0.004}{0.015}$	0.020	Measured with the wheel-case bolted to the air-intake.
14	Spare Drive Idler Gear and Generator Drive Idler Gear Ball Bearings in Gears Gear—bore Ball bearing — outside diameter	$\frac{1.6528}{1.6533}$ $\frac{41,981 \text{ mm.}}{41,994 \text{ mm.}}$ $\frac{1.6530}{1.6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	— — — —	 $\frac{-0.0007}{+0.0003}$ $\frac{-0.019 \text{ mm.}}{+0.007 \text{ mm.}}$	Not permitted	
15	Spare Drive Idler Gear and Generator Drive Idler Gear Ball Bearings End float between inner and outer races	—	—	$\frac{0.0031}{0.0054}$ $\frac{0.002}{0.004}$	0.008 0.006	Hoffman type L20.N or L20.N.V2 Ransome and Marles type KLNJ.20
16	Starter Drive Ball Bearing in Planet Gears Carrier Planet gears carrier—bore Ball bearing—outside diameter	$\frac{1.9993}{1.9998}$ $\frac{1.9990}{1.9995}$	2.0008 1.998	$\frac{-0.0002}{+0.0008}$	+0.0013	
17	Starter Drive Ball Bearing End float between inner and outer races	—	—	$\frac{0.004}{0.007}$ $\frac{0.004}{0.006}$	0.010 0.009	Hoffman type S10V with solid cage Ransome and Marles type KLNJ.1
18	Planet Gears Carrier in Bottom Cover Bearing Bearing—bore Planet gears carrier—spigot diameter	$\frac{2.3750}{2.3755}$ $\frac{2.3720}{2.3725}$	2.3775 2.370	$\frac{0.0025}{0.0035}$	0.005	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
19	Planet Gears Carrier and Cover					
	End float	—	—	$\frac{0.003}{0.021}$ $\frac{0.003}{0.023}$	0.030 0.030	Pre-mod. 845 Mod. 845 and 1036
20	Planet Gears Carrier Cover in Top Cover					
	Top cover—bore	$\frac{1.6250}{1.6255}$	1.628	$\frac{0.004}{0.005}$	0.007	
	Planet gears carrier cover—spigot diameter	$\frac{1.6205}{1.6210}$	1.618			
21	Needle Rollers in Planet Gears					
	Diametral clearance	—	—	$\frac{0.0008}{0.0022}$	0.0035	
22	Planet Gears					
	End float	—	—	$\frac{0.002}{0.008}$	0.012	
23	Sun Gear and Planet Gears					
	Backlash	—	—	$\frac{0.003}{0.007}$	0.010	
24	Planet Gears and Annulus Gear					
	Backlash	—	—	$\frac{0.004}{0.009}$	0.012	
25	Starter Shaft in Sun Gear					
	Sun gear serrations—dimension between parallel faces	$\frac{0.4577}{0.4589}$	0.4641	—	—	
26	Starter Dog in Starter Drive Dog					
	Axial clearance between dog teeth	—	—	$\frac{0.015}{0.025}$	—	This clearance is measured with starter drive dog bottoming on planet gears carrier nut and is adjusted by means of an adjusting shim situated between wheelcase top and starter gears casing. The nominal thickness of shim supplied is 0.114 in 0.003 laminations.
27	Starter Drive Dog on Planet Gears Carrier					
	End float of starter drive dog when free	—	—	$\frac{0.002}{0.008}$	0.014	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
28	Starter Drive Dog on Planet Gears Carrier			$\frac{0.0017}{0.0068}$	0.012	Part No. 92621
	Backlash (angular movement)	—	—	$\frac{0.0015}{0.0060}$	0.011	Part No. 91689
29	Generator Driving Gears in Bushes					
	Bush—bore	$\frac{1.1250}{1.1255}$	1.128	$\frac{0.002}{0.003}$	0.005	
	Gear shank—outside diameter	$\frac{1.1225}{1.1230}$	1.120			
30	Generator Driving Gears End float	—	—	$\frac{0.004}{0.015}$	0.020	Measured with the wheel-case bolted to the air-intake.
31	Generator Driving Quillshafts in Gears and Sleeves, Spline Backlash					
	Gear and sleeve—width of splineways	$\frac{0.1870}{0.1885}$	0.1945	$\frac{0.0015}{0.0050}$	0.009	
	Quillshaft—width of splines	$\frac{0.1835}{0.1855}$	0.178			
32	Generator Shafts in Sleeves					
	Sleeve—width of splineways	$\frac{0.1870}{0.1885}$	0.1945	—	—	
33	Generators Idler Gear in Bush					
	Bush—bore	$\frac{1.1250}{1.1255}$	1.128	$\frac{0.002}{0.003}$	0.005	
	Gear shank—outside diameter	$\frac{1.1225}{1.1230}$	1.120			

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April, 1958

WHEELCASE TOP

de Havilland
Ghost Forty-eight

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
34	Generators Idler Gear, End Float Gear shank—length Bush—length over thrust faces	$\frac{1.650}{1.652}$ $\frac{1.644}{1.646}$	1.658 1.638	$\frac{0.004}{0.008}$	0.012	
35	Compressor Drive Gear, Engine Speed Indica- tor Drive Gear and Spare Drive Gear Backlash between either pair	—	—	$\frac{0.0030}{0.0085}$	0.012	
36	Spare Drive Gear and Idler Gear Backlash	—	—	$\frac{0.0040}{0.0105}$	0.014	
37	Spare Drive Idler Gear, Starter Gear and Generator Idler Gear Backlash between either pair	—	—	$\frac{0.0030}{0.0085}$	0.012	
38	Generator Idler Gears Backlash	—	—	$\frac{0.0040}{0.0105}$	0.014	
39	Generator Idler Pinion and Generator Driving Gears Backlash between either pair	—	—	$\frac{0.00425}{0.01175}$	0.015	

Revised by Amendment No. 137
April, 1958

Wheelcase Top (Ghost 48 Mk. 1) (Fig. 3a — Alternative)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Compressor Drive Gear Flange in Bush					
	Bush bore	$\frac{0.9375}{0.9380}$	0.941	$\frac{0.0015}{0.0025}$	0.005	
	Gear flange shank—outside diameter	$\frac{0.9355}{0.9360}$	0.9325			
2	Compressor Drive Gear End float	—	—	$\frac{0.004}{0.015}$	0.020	Measured with the wheelcase bolted to the air-intake.
3	Compressor Drive Quill Shaft in Spur Gear and Sleeve, Spline Backlash					
	Gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Quillshaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
4	Compressor Driving Shaft in Bevel Gear and Sleeve, Spline Backlash					
	Gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Shaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
5	Compressor Housing and Adapter Bevel Gears in Bushes					
	Bush—bore	$\frac{0.6875}{0.6880}$	0.6905	$\frac{0.0015}{0.0025}$	0.0045	
	Bevel gear shank—outside diameter	$\frac{0.6855}{0.6860}$	0.683			
6	Compressor Housing Bevel Gear End float	—	—	$\frac{0.0027}{0.0256}$	0.036	The end float is measured as the clearance between the washer and the housing as indicated on Fig. 3a.

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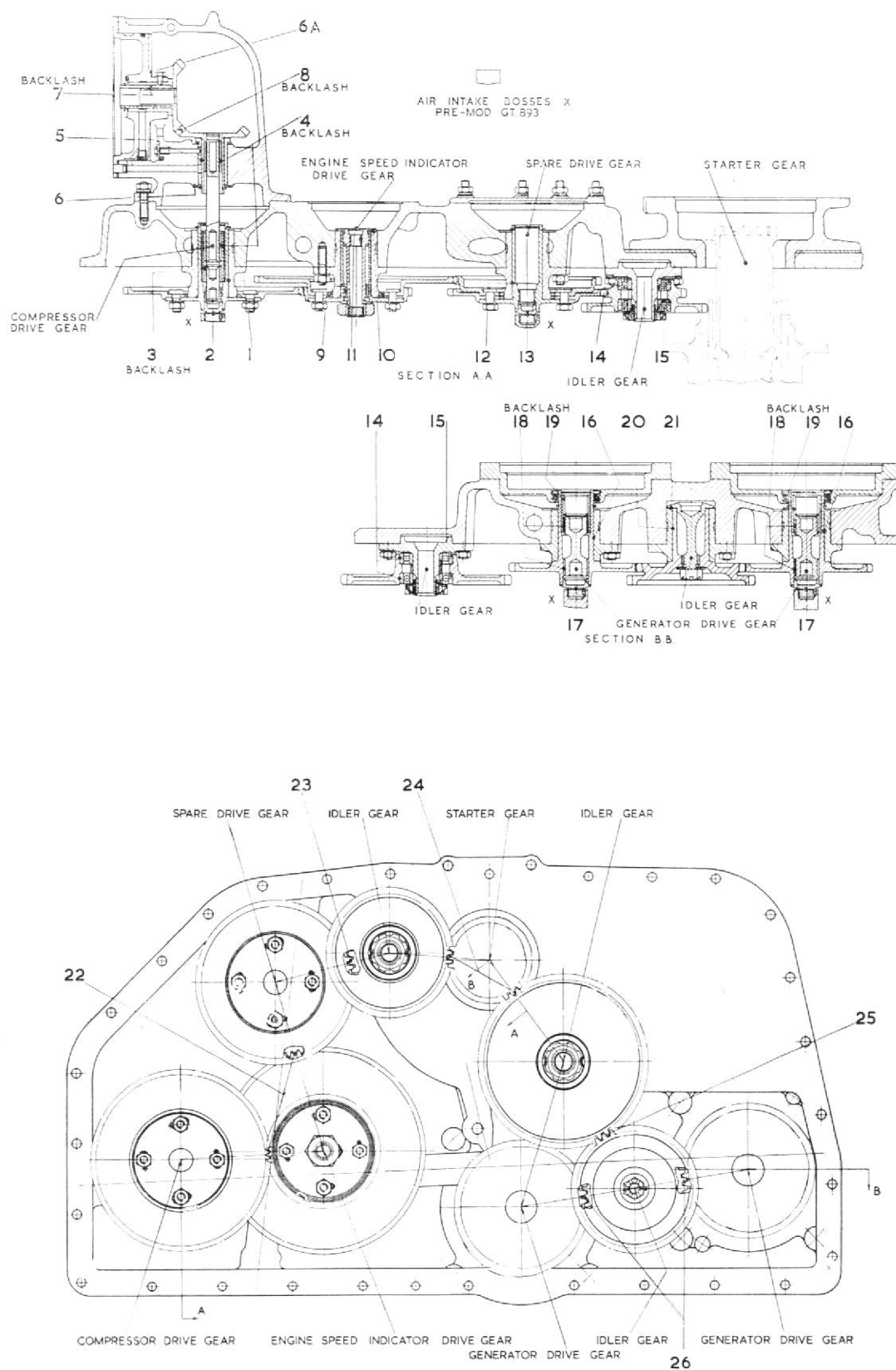


Fig. 3a (alternative). Wheelcase top (Ghost 48 Mk. 1).

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
6a	Compressor Adapter Bevel Gear End float	—	—	$\frac{0.0026}{0.0306}$	0.040	The end float is measured as the clearance between the washer and the adapter as indicated on Fig. 3a.
7	Compressor Shaft in Adapter Bevel Gear Gear—width of spline-ways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
8	Bevel Gears Backlash	—	—	$\frac{0.005}{0.011}$	0.015	Adjustable by means of the following shims:— One situated beneath the compressor adapter flange and another beneath the compressor housing bush flange, both 0.060 nominal thickness, half-solid and half shims or all laminated in 0.002 or 0.003 increments.
9	Engine Speed Indicator Drive Gear in Bush Bush-bore Gear shank—outside diameter	$\frac{0.9375}{0.9380}$ $\frac{0.9355}{0.9360}$	0.941 0.9325	$\frac{0.0015}{0.0025}$	0.005	
10	Engine Speed Indicator Drive Gear, End Float Gear flange shank-length Bush-length over thrust faces	$\frac{2.025}{2.027}$ $\frac{2.019}{2.021}$	2.033 2.013	$\frac{0.004}{0.008}$	0.012	
11	Engine Speed Indicator Shaft in Gear Retaining Bolt Bolt serrations—dimension between parallel faces	$\frac{0.2208}{0.2217}$	0.2263	—	—	

WHEELCASE TOP

de Havilland
Ghost Forty eight

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
12	Spare Drive Gear Flange in Bush					
	Bush-bore	$\frac{0.9375}{0.9380}$	0.941	$\frac{0.0015}{0.0025}$	0.005	
	Gear flange shank—outside diameter	$\frac{0.9355}{0.9360}$	0.9325			
13	Spare Drive Gear End float	—	—	$\frac{0.004}{0.015}$	0.020	Measured with the wheel case bolted to the air-intake.
14	Spare Drive Idler Gear and Generator Drive Idler Gear Ball Bearings in Gears					
	Gear—bore	$\frac{1.6528}{1.6532}$	—			
		$\frac{41.981 \text{ mm.}}{41.993 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0002}$		
	Ball bearing—outside diameter	$\frac{1.6530}{1.6535}$	—	$\frac{-0.019 \text{ mm.}}{+0.005 \text{ mm.}}$	Not permitted	
		$\frac{41.987 \text{ mm.}}{42.000 \text{ mm.}}$	—			
15	Spare Drive Idler Gear and Generator Drive Idler Gear Ball Bearings					
	End float between inner and outer races	—	—	$\frac{0.0031}{0.0054}$	0.008	Hoffman type L20N or L20N.V2
				$\frac{0.002}{0.004}$	0.006	Ransome and Marles type KLNJ20
16	Generator Driving Gears in Bushes					
	Bush—bore	$\frac{1.1250}{1.1255}$	1.128	$\frac{0.002}{0.003}$	0.005	
	Gear shank—outside diameter	$\frac{1.1225}{1.1230}$	1.120			
17	Generator Driving Gears End float	—	—	$\frac{0.004}{0.015}$	0.020	Measured with the wheel-case bolted to the air-intake.

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
18	Generator Driving Quill- shafts in Gears and Sleeves, Spline Back- lash					
	Gear and sleeve—width of splineways	$\frac{0.1870}{0.1885}$	0.1945	$\frac{0.0015}{0.0050}$	0.009	
	Quillshaft—width of splines	$\frac{0.1835}{0.1855}$	0.178			
19	Generator Shafts in Sleeves					
	Sleeve—width of spline- ways	$\frac{0.1870}{0.1885}$	0.1945	—	—	
20	Generators Idler Gear in Bush					
	Bush—bore	$\frac{1.1250}{1.1255}$	1.128	$\frac{0.002}{0.003}$	0.005	
	Gear shank—outside diameter	$\frac{1.1225}{1.1230}$	1.120			
21	Generators Idler Gear, End Float					
	Gear shank—length	$\frac{1.650}{1.652}$	1.658	$\frac{0.002}{0.006}$	0.010	
	Bush—length over thrust faces	$\frac{1.646}{1.648}$	1.640			
22	Compressor Drive Gear, Engine Speed Indica- tor Drive Gear and Spare Drive Gear					
	Backlash between either pair	—	—	$\frac{0.0030}{0.0085}$	0.012	
23	Spare Drive Gear and Idler Gear					
	Backlash	—	—	$\frac{0.0040}{0.0105}$	0.014	

WHEELCASE BOTTOM

de Havilland
Ghost Forty-eight

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
24	Spare Drive Idler Gear, Starter Gear and Generator Idler Gear Backlash between either pair	—	—	$\frac{0.0030}{0.0085}$	0.012	
25	Generator Idler Gears Backlash	—	—	$\frac{0.0040}{0.0105}$	0.014	
26	Generator Idler Pinion and Generator Driving Gears. Backlash between either pair	—	—	$\frac{0.00425}{0.01175}$	0.015	

Wheelcase Bottom (Ghost 48 Mk. 1) (Fig. 4 — pre-mod. 383 and Fig. 4a — mod. 383)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Oil Pump Drive Gear in Bush					
	Bush—bore	$\frac{0.7500}{0.7505}$	0.7535	$\frac{0.0015}{0.0030}$	0.005	
	Gear shank—outside diameter	$\frac{0.7475}{0.7485}$	0.745			

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
1A	Oil Pump Drive Gear Bush in Wheelcase					
	Standard size	0.9500				
	Wheelcase—bore	0.9505	—	—0.0023	—	
	Bush—outside diameter	0.9518	—	—0.0013	—	
		0.9523				
	1st oversize					
	Wheelcase—bore	0.9600	—	—0.0023	—	T.R.393 in Chapter 29
		0.9605		—0.0013		
	Bush—outside diameter	0.9618	—	—0.0013	—	
		0.9623				
	2nd oversize					
	Wheelcase—bore	0.9700	—	—0.0023	—	
		0.9705		—0.0013		
	Bush—outside diameter	0.9718	—			
		0.9723				

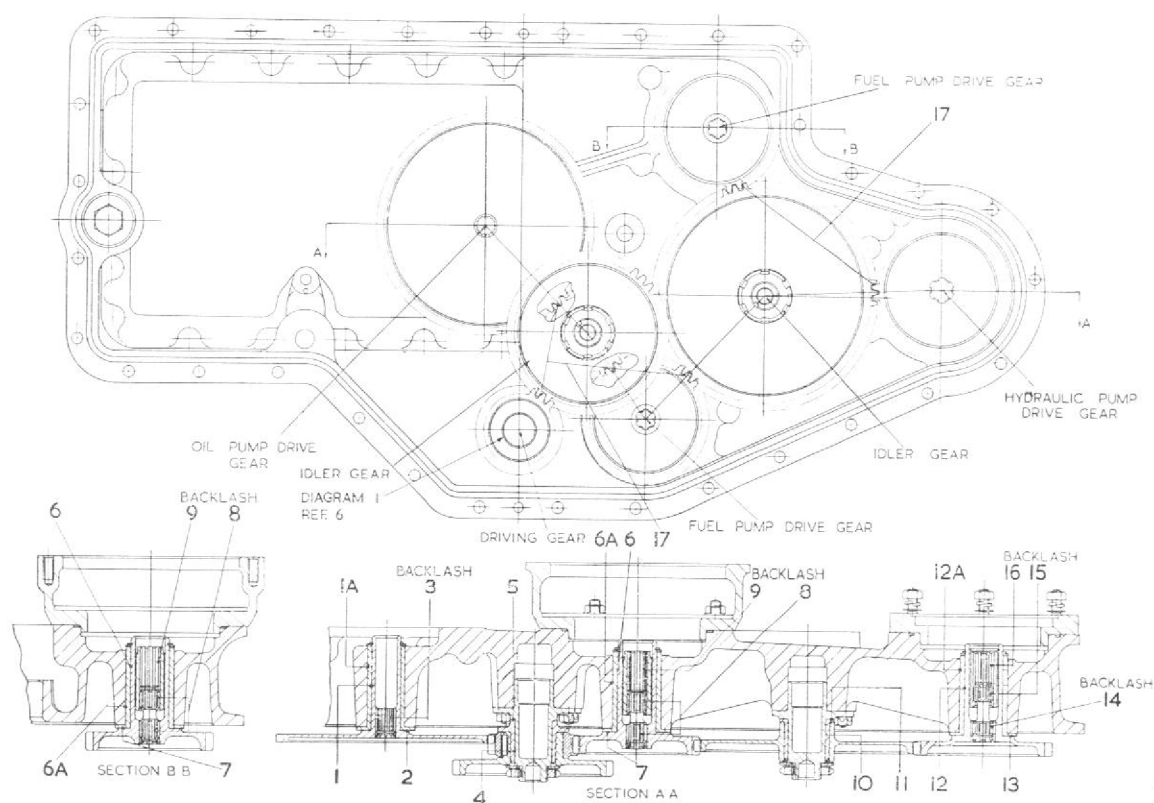


Fig. 4. Wheelcase bottom (Ghost 48 Mk. 1).

Revised by Amendment No. 125
July, 1956

WHEELCASE BOTTOM

de Havilland
Ghost Forty-eight

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
2	Oil Pump Drive Gear End float	—	—	$\frac{0.006}{0.018}$	0.024	
3	Oil Pump Drive Shaft in Gear, Serration Backlash					
	Gear serrations—dimension between parallel faces	$\frac{0.2944}{0.2953}$	0.2999	$\frac{0.0005}{0.0033}$	0.006	
	Shaft serrations—dimension over parallel faces	$\frac{0.2920}{0.2939}$	0.2884			

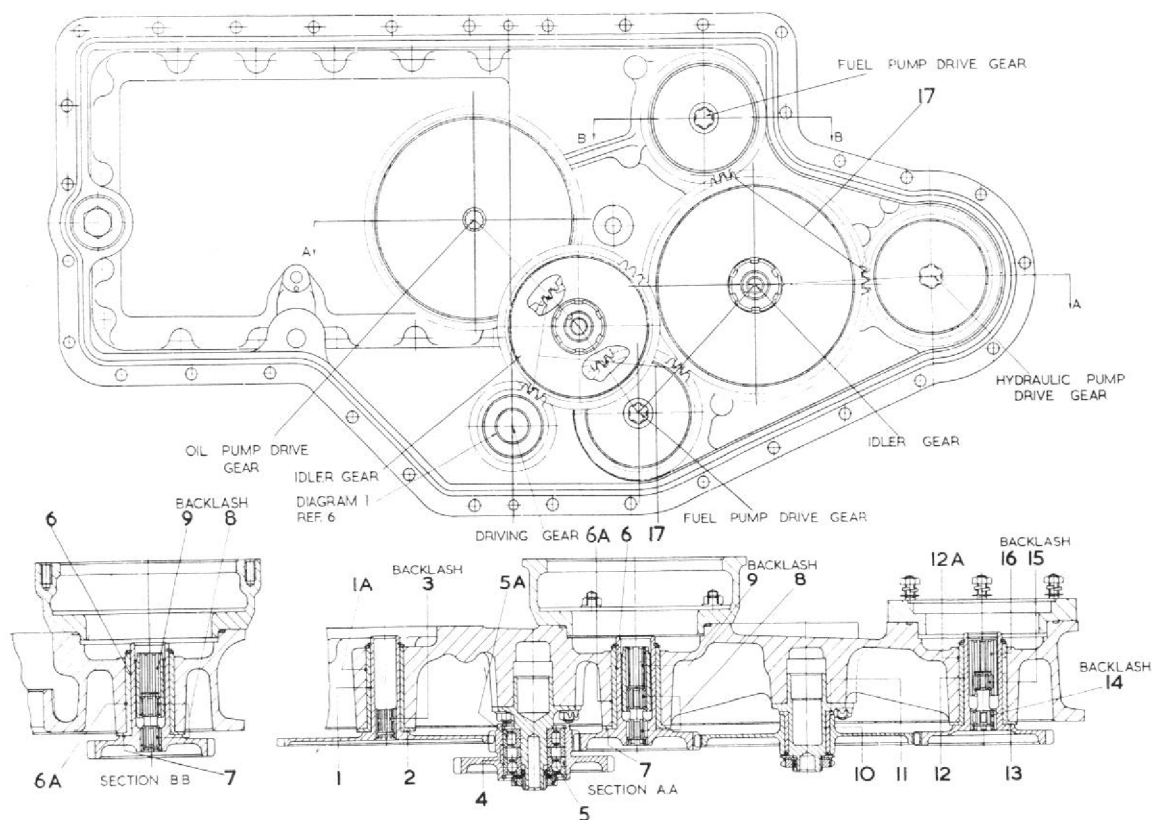


Fig. 4a. Wheelcase bottom (Ghost 48 Mk. 1).

Revised by Amendment No. 125
July, 1956

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
4	Oil and Fuel Pump Idler Gear Bush on Spindle					
	Bush—bore	$\frac{0.9500}{0.9505}$	0.9525	$\frac{0.0025}{0.0035}$	0.005	Pre-mod. 383. See Fig. 4
	Spindle—outside diameter	$\frac{0.9470}{0.9475}$	0.945			
4	Ball and Roller Bearings in Oil and Fuel Pump Idler Gear					
	Idler gear—bore	$\frac{1.5741}{1.5746}$	—			
		$\frac{39.982 \text{ mm.}}{39.995 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0003}$	Not permitted	Mod. 383. See Fig. 4a.
	Bearings—outside diameter	$\frac{1.5743}{1.5748}$	—	$\frac{-0.018 \text{ mm.}}{+0.008 \text{ mm.}}$		
		$\frac{39.987 \text{ mm.}}{40.000 \text{ mm.}}$	—			
5	Oil and Fuel Pump Idler Gear Assembly, End Float					
	Idler gear spindle— length from thrust face of flange to washer abut- ment shoulder	$\frac{1.150}{1.151}$	1.158	$\frac{0.006}{0.009}$	0.014	Pre-mod. 383. See Fig. 4
	Gear assembly—length over thrust faces	$\frac{1.142}{1.144}$	1.136			
5	Oil and Fuel Pump Idler Gear Ball Bearing					
	End float between inner and outer races	—	—	$\frac{0.0035}{0.0060}$	0.009	Mod. 383. See Fig. 4a.
5a	Oil and Fuel Pump Idler Gear Roller Bearing					
	Diametral clearance be- tween rollers and outer race	—	—	$\frac{0.0005}{0.0010}$	0.002	See Fig. 4a.
6	Fuel Pump Drive Gears in Bushes					
	Bush—bore	$\frac{1.0000}{1.0005}$	1.0035	$\frac{0.0015}{0.0025}$	0.005	
	Gear shank—outside diameter	$\frac{0.9980}{0.9985}$	0.995			

WHEELCASE BOTTOM

de Havilland
Ghost Forty-eight

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
6A	Fuel Pump Drive Gear Bushes in Wheelcase					
	Standard size					
	Wheelcase—bore	$\frac{1.2400}{1.2405}$	—	$\frac{—0.0028}{—0.0018}$	—	
	Bush—outside diameter	$\frac{1.2423}{1.2428}$	—	—	—	
	1st oversize					
	Wheelcase—bore	$\frac{1.2500}{1.2505}$	—	$\frac{—0.0028}{—0.0018}$	—	T.R.393 in Chapter 29
	Bush—outside diameter	$\frac{1.2523}{1.2528}$	—	—	—	
	2nd oversize					
	Wheelcase—bore	$\frac{1.2600}{1.2605}$	—	$\frac{—0.0028}{—0.0018}$	—	
	Bush—outside diameter	$\frac{1.2623}{1.2628}$	—	—	—	
7	Fuel Pump Drive Gears End float	—	—	$\frac{0.006}{0.018}$	0.024	
8	Fuel Pump Drive Quill- shaft in Gear and Sleeve, Spline Back- lash					
	Gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Quillshaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
9	Fuel Pump Shaft in Sleeve Sleeve—width of spline- ways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
10	Fuel and Hydraulic Pump Idler Gear Bush on Spindle					
	Bush—bore	$\frac{0.9500}{0.9505}$	0.9535	$\frac{0.0015}{0.0025}$	0.005	
	Spindle—outside diameter	$\frac{0.9480}{0.9485}$	0.945			

Revised by Amendment No. 125
July, 1956

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
11	Fuel and Hydraulic Pump Idler Gear Assembly End Float Idler gear spindle— length from thrust face of flange to washer abutment shoulder Gear assembly—length over thrust faces	$\frac{1.100}{1.101}$ $\frac{1.093}{1.095}$	1.107 1.088	$\frac{0.005}{0.008}$	0.012	
12	Hydraulic Pump Drive Gear in Bush Bush—bore Gear shank—outside diameter	$\frac{1.0000}{1.0005}$ $\frac{0.9980}{0.9985}$	1.0035 0.995	$\frac{0.0015}{0.0025}$	0.005	
12a	Hydraulic Pump Drive Gear Bush in Wheel- case Standard size Wheelcase—bore Bush—outside diameter 1st oversize Wheelcase—bore Bush—outside diameter 2nd oversize Wheelcase—bore Bush—outside diameter	$\frac{1.2400}{1.2405}$ $\frac{1.2423}{1.2428}$ $\frac{1.2500}{1.2505}$ $\frac{1.2523}{1.2528}$ $\frac{1.2600}{1.2605}$ $\frac{1.2623}{1.2628}$	— — — — — —	— $\frac{-0.0028}{-0.0018}$ — $\frac{-0.0028}{-0.0018}$ — $\frac{-0.0028}{-0.0018}$	— — — — — —	T.R.393 in Chapter 29
13	Hydraulic Pump Drive Gear End float	—	—	$\frac{0.006}{0.018}$	0.024	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
14	Hydraulic Pump Drive Quillshaft in Gear, Spline Backlash					
	Gear—width of spline-ways	$\frac{0.1560}{0.1575}$	0.1615	$\frac{0.0015}{0.0045}$	0.007	
	Quillshaft—width of splines	$\frac{0.1530}{0.1545}$	0.149			
15	Hydraulic Pump Drive Quillshaft in Sleeve					
	Gear—width of spline-ways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Quillshaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
16	Hydraulic Pump Shaft in Sleeve					
	Sleeve—width of spline-ways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
17	All Gears Backlash	—	—	$\frac{0.0030}{0.0085}$	0.012	

Oil Sump (Ghost 48 Mk. 1) (Fig. 5)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Oil Pump Driving and Driven Gear Spindles in Oil Pump Body and Cover					
	Oil pump body and cover—bore	$\frac{0.6250}{0.6255}$	0.6277	$\frac{0.0013}{0.0023}$	0.004	
	Gear spindles—diameter	$\frac{0.6232}{0.6237}$	0.621			
2	Oil Pump Gears Backlash	—	—	$\frac{0.006}{0.014}$	0.020	

Revised by Amendment No. 125
July, 1956

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
3	Oil Pump Driving and Driven Gears, End Float					The end float may be restored by carefully lapping the joint face of the oil pump body but the recess depths must not be reduced below the minimum new dimensions.
	Housing—depth of recess	$\frac{0.8005}{0.8025}$	0.804	$\frac{0.0005}{0.0035}$	0.004	
	Gears—tooth width	$\frac{0.799}{0.800}$	0.7965			
4	Oil Pump Driving and Driven Gears, Diametral clearance					
	Housing—recess diameter	$\frac{1.397}{1.398}$	1.401	$\frac{0.003}{0.005}$	0.007	
	Gears—diameter over teeth	$\frac{1.393}{1.394}$	1.390			

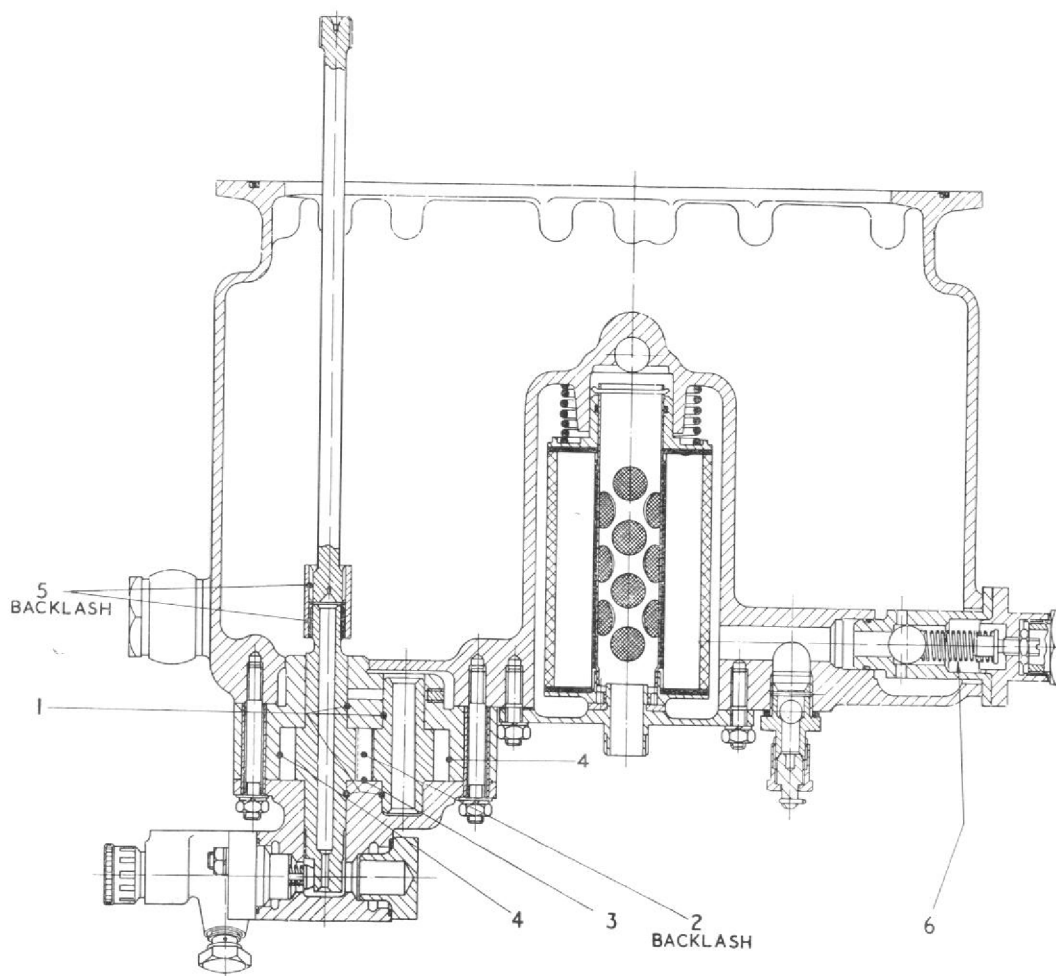


Fig. 5. Oil sump (Ghost 48 Mk. 1).

Revised by Amendment No. 125
July, 1956

Ref. No.	Component and Description	Worn Clearances	Permissible Worn Dimensions	New Clearances	New Dimensions Permissible	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
5	Oil Pump Driving Gear Spindle and Shaft in Coupling Sleeve, Serration Backlash					
	Coupling sleeve serrations—dimension between parallel faces	$\frac{0.2944}{0.2953}$	0.2999	$\frac{0.0005}{0.0033}$	0.006	
	Spindle and shaft serrations—dimension over parallel faces	$\frac{0.2920}{0.2939}$	0.2884			
6	Oil Pressure Relief Valve Spring	—	—	—	—	To be inspected visually for defects. Subject to function test.

Impeller Vane and Front Bearing (Ghost 48 Mk. 1) (Fig. 6)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Impeller Clearance					
	Clearance between impeller vane and diffuser casing measured at extreme tip of impeller vane	—	—	—	—	This check is obsolete and should therefore be ignored.
2	Impeller Clearance					
	Clearance between impeller vane and diffuser casing		Pre-mod. 916 see fig. 6 Mod. 916 see fig. 7	$\left\{ \begin{array}{l} 0.060 \\ 0.070 \\ 0.070 \\ 0.080 \end{array} \right.$	$\frac{0.0595}{0.0700}$ $\frac{0.0695}{0.0800}$	Measured at the four lead-tipped plug positions on the diffuser casing. Any distortion around the impeller profile of the diffuser casing at this diametral position must not exceed 0.010.
3	Impeller Clearance					
	Clearance between impeller vane and diffuser casing	—	—	—	—	See Fig. 6. This check is obsolete and should therefore be ignored.

Revised by Amendment No. 137
April, 1958

This technical drawing illustrates a cross-section of a mechanical assembly, possibly a ship's propeller, with various components labeled with letters and numbers. The drawing includes two circular inset details:

- Left Inset:** Labeled "PART SECTION AT X WHEN ADJUSTING SHIMS ARE FITTED. (SEE REFERENCE 6.)". It shows a detail of the assembly at point X, highlighting the use of "ADJUSTING SHIMS".
- Right Inset:** Labeled "PART SECTION AT Y". It shows a detail of the assembly at point Y, highlighting a feature labeled "FRETTING 12A".

The main drawing features the following labels and components:

- Top Labels:** "ECCENTRICITY" (appearing twice), "MOD. 897", "SWASH 9", and "SQUARENESS".
- Left Side Labels:** "X", "7", "1", "2", "3", "4", "5", "A", "N", "13", "18 BACKLASH", "14", "15", "16", "17 BACKLASH", "20".
- Right Side Labels:** "12", "8", "ECCENTRICITY", "12A".
- Internal Labels:** "11", "B", "C", "D", "E", "6", "10", "19", "F", "G", "H", "9", "12".

The drawing shows a complex mechanical structure with various surfaces, edges, and internal features. The use of hatching indicates different materials or cross-sections. The labels provide specific identification for each part and feature, facilitating assembly and inspection.

*Revised by Amendment No. 137
April, 1958*

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
9	Impeller "Swash" Total indicator clock readings at the following Stations:— A 0.0015 B (1 in. from outer edge)* 0.008 C (1 in. from outer sealing groove)* 0.006 D 0.004 E 0.003					Measured at final balance of (a) impeller assembly (Stations A, B, C, D, and E) and (b) rotative assembly comprising impeller, main shaft, extension shaft and turbine disc and blade assemblies (Stations A, B, C, D, E, F, and G). * All location dimensions are approximate.
10	Main Shaft Eccentricity, Impeller End Total indicator clock readings at the following Stations:— F 0.005 G 0.005					The location of Station F to be approximately as indicated on diagram.
11	Diffuser Casing Rear Cover Eccentricity of bore, total indicator clock readings	0.008	0.020	—	—	Provided that a check is made by means of either checking fixture T.75908 or alignment mandrel T.72482.
12	Diffuser Casing Rear Cover Lack of squareness of sealing plate flange abutment face with bore, total indicator clock readings	0.006	0.008	—	—	
12a	Diffuser Casing Rear Cover Maximum depth of fretting on combustion chamber joint face	—	0.005	—	—	
13	Ball Bearing End float between inner and outer races	Hoffman type No. 3967 or 3967F Ransome and Marles type 4LJ2½ Skefko type S.K.F. No. 403524 or 403524B	0.012 0.017 0.018 Max. 0.015 0.020	0.018 Not permitted Not permitted		Where the engine has completed 100 hours running before overhaul, a new front bearing must be fitted. Where the engine has been dismantled before it has completed 100 hours running, the maximum permissible end float, and the general condition of the bearing, in conjunction with a consideration of the hours which the bearing has run and is expected to run after reassembly must decide whether the original bearing should be refitted or not. Measured with 25 lb. end load.

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
14	Impeller Pivot in Ball Bearing					
	Ball bearing—bore	$\frac{2.7497}{2.7502}$	—	$\frac{-0.0005}{+0.0005}$	—	Hoffman type No. 3967 and Skefko type SKF Nos. 403524 and 403524B ball bearing
	Pivot—diameter	$\frac{2.7497}{2.7502}$	—			
	Ball bearing—bore	$\frac{2.7497}{2.7500}$	—	$\frac{-0.0005}{+0.0003}$	—	Ransome and Marles type 4LJ2 $\frac{1}{4}$ ball bearing.
	Pivot—diameter	$\frac{2.7497}{2.7502}$	—			
15	Ball Bearing in Front Bearing Housing					
	Bearing housing—bore	$\frac{5.2487}{5.2492}$	—	$\frac{0.000}{0.001}$	—	Hoffman type No. 3967 and Skefko type SKF Nos. 403524 and 403524B ball bearing.
	Ball bearing—outside diameter	$\frac{5.2482}{5.2487}$	—			
	Bearing housing—bore	$\frac{5.2487}{5.2492}$	—	$\frac{0.0002}{0.0010}$	—	Ransome and Marles type 4LJ2 $\frac{1}{4}$ ball bearing.
	Ball bearing—outside diameter	$\frac{5.2482}{5.2485}$	—			
16	Bearing Spacer in Bearing Housing					
	Bearing housing—bore	$\frac{3.2520}{3.2525}$	—	$\frac{0.0075}{0.0095}$	Not applicable	
	Spacer—outside diameter	$\frac{3.2430}{3.2445}$	—			
17	Accessory Drive Shaft in Impeller Pivot, Serration Backlash					
	Impeller pivot serrations—dimension between parallel faces	$\frac{1.3320}{1.3338}$	1.3411	$\frac{0.0009}{0.0066}$	0.010	
	Accessory drive shaft serrations—dimension over parallel faces	$\frac{1.3272}{1.3311}$	1.3220			

Revised by Amendment No. 114
September, 1954

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
18	Centre Housing Drive Shaft in Accessory Drive Shaft, Serration Backlash					
	Accessory drive shaft serrations—dimension between parallel faces	$\frac{0.7820}{0.7835}$	0.7892	$\frac{0.0008}{0.0055}$	0.008	
	Centre housing drive shaft serrations—dimen- sion over parallel faces	$\frac{0.7780}{0.7812}$	0.7740			
19	Main Shaft Spigot Bore					
	Spigot bore—diameter (Standard size)	$\frac{10.375}{10.376}$	10.391*	—	—	* This diameter to be measured at outer end of bore.
	Spigot bore—diameter (0.010 inch undersize)	$\frac{10.365}{10.366}$	10.381*	—	—	
	Spigot bore—diameter (0.020 inch undersize)	$\frac{10.355}{10.356}$	10.371*	—	—	
	Spigot bore—diameter (0.030 inch undersize)	$\frac{10.345}{10.346}$	10.361*	—	—	
	Spigot bore—ovality	—	0.005	—	—	The maximum diameter of spigot bore to be not greater than the relevant Permissible Worn Dimen- sion.
	Spigot bore—taper	—	0.005	—	—	
20	Impeller Pivot in Impeller					
	Standard pivot bore:—	$\frac{2.5250}{2.5255}$	—	—	—	
	Impeller hub-pivot bore	$\frac{2.5278}{2.5283}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5350}{2.5355}$	—	$\frac{-0.0033}{-0.0023}$	—	
	0.010 oversize pivot bore:—	$\frac{2.5378}{2.5383}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller hub-pivot bore	$\frac{2.5450}{2.5455}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5478}{2.5483}$	—	$\frac{-0.0033}{-0.0023}$	—	
	0.020 oversize pivot bore:—					
	Impeller hub-pivot bore					See chapter 28, T.R. 222
	Impeller pivot—outside diameter					

Continued overleaf

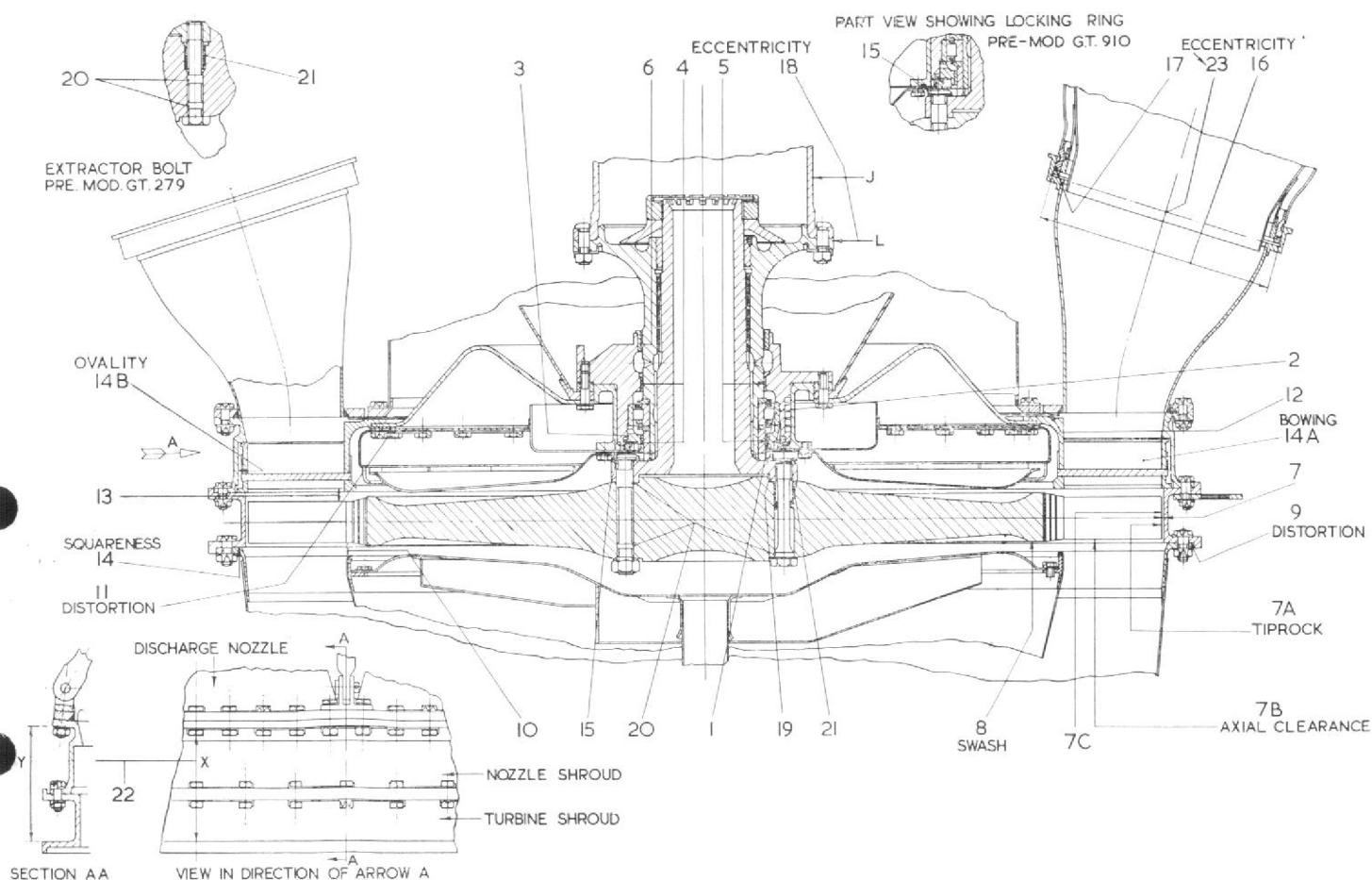
Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
20 (contd.)	0.030 oversize pivot bore:—					
	Impeller hub-pivot bore	$\frac{2.5550}{2.5555}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5578}{2.5583}$	—			
	0.040 oversize pivot bore:—					See chapter 28, T.R. 222
	Impeller hub-pivot bore	$\frac{2.5650}{2.5655}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5678}{2.5683}$	—			

Turbine Disc and Rear Bearing (Fig. 8)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Roller Bearing Diametral clearance between rollers and outer race	—	—	$\frac{0.003}{0.004}$	0.006	Where the engine has completed 100 hours running before overhaul, a new rear bearing must be fitted. Where the engine has been dismantled before it has completed 100 hours running, the permissible worn clearance, and the general condition of the bearing, in conjunction with a consideration of the hours which the bearing has run, and is expected to run after reassembly, must decide whether the original bearing should be refitted or not.
2	Roller Bearing in Rear Bearing Housing					
	Bearing housing—bore	$\frac{5.2492}{5.2497}$	—	$\frac{0.0007}{0.0015}$	—	Hoffman type No. L2984 and Ransome and Marles type 2XLRJ 3 $\frac{1}{4}$ roller bearing.
	Roller bearing—outside diameter	$\frac{5.2482}{5.2485}$	—			
	Bearing housing—bore	$\frac{5.2492}{5.2497}$	—	$\frac{0.0005}{0.0015}$	—	Skefko type SKF No. 403522 roller bearing.
	Roller bearing—outside diameter	$\frac{5.2482}{5.2487}$	—			
3	Sealing Housing in Rear Bearing Housing					
	Bearing housing—bore	$\frac{5.3750}{5.3760}$	5.3785	$\frac{0.0005}{0.0020}$	0.004	
	Sealing housing—outside diameter	$\frac{5.3740}{5.3745}$	5.371			

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April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
4	Extension Shaft and Distance Piece in Safety Bearings					
	Bearings—bore	$\frac{4.2020}{4.2030}$	—	$\frac{0.0145}{0.0160}$	Not applicable	
	Shaft and distance piece—outside diameter	$\frac{4.1870}{4.1875}$	—			
5	Safety Bearings					
	Eccentricity of safety bearing bore, total indicator clock readings	0.003	0.0035	—	—	
6	Extension Shaft in Labyrinth Seal Bush					
	Radial clearance between extension shaft and labyrinth seal bush	—	—	$\frac{0.00675}{0.00800}$	0.0035	



Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
7	Turbine Wheel in Shroud					
	Turbine shroud—bore	$\frac{31.909}{31.919}$	—	* $\frac{0.094}{0.103}$	0.065	Radial clearance.
	Turbine wheel with blades fitted—diameter ‡ (see ref. 7c)	$\frac{31.713}{31.721}$ ‡	—			
	Turbine shroud bore eccentricity to main shaft assembly total indicator clock reading	—	0.020	—	—	
* <i>Mod. 400. Part 1 embodied.</i> The minimum clearance of 0.094 quoted is for engines fitted with new turbine shrouds before initial engine test. This clearance reduces after test when a minimum clearance of 0.079 is acceptable. <i>Mod. 400. Parts 2 or 3 embodied.</i> A minimum clearance of 0.079 before engine test and 0.065 after engine test is acceptable on engines fitted with reconditioned turbine shrouds. If during engine reconditioning the clearance is found to be less than the Permissible Worn Clearance of 0.065, the shroud ring bore is to be trued in accordance with T.R.376 (in chapter 28F), but the minimum radial thickness of the shroud ring must not be less than 0.120.						
7a	Turbine Blades in Turbine Disc, Tip Rock (mod. 522) Total blade tip rock or circumferential movement of each blade relative to turbine disc	$\frac{0.001}{0.020}$	0.020	—	—	The tip rock of 0.001/0.020 given in column (3) is only applicable to blades before peening. After initial engine test, new or reconditioned engines may be accepted with a tip rock of 0.020 as given in column (4).
7b	Turbine Blades in Turbine Disc, Axial Movement (mod. 522 & 731) Mod. 522 standard only: Axial movement of each blade relative to turbine disc Mod. 731 standard and subsequently:— Axial movement of each blade relative to turbine disc	0.035 0.015	After engine test on new or overhauled engines, if the axial movement is found to exceed 0.035 in. new blades to mod. 731, or a later standard, must be fitted. Measured during assembly before engine test on new or overhauled engines. If the axial movement is found to be greater than 0.015 in. but not greater than 0.020 in., the affected blades may be hand peened to give the required maximum of 0.015 in. If greater than 0.020 in. new blades must be fitted.			
7c	Turbine Disc and Blades, Growth Radial growth at blade tips	—	0.005	The growth or variation in radial dimension at the turbine blade tips may be determined by subtracting the minimum and maximum radial dimensions at initial manufacture from the corresponding dimensions (i.e. at the same blade positions) at overhaul. These radial dimensions are measured by means of gauges T.72828 and T.72829. It is only possible to make a direct comparison at the original minimum and maximum blade positions, but the radial dimensions should be checked over all the blades in the disc for obvious signs of growth (i.e. blades standing proud of the general assembly). Any suspect turbine disc and blades assembly must be returned to the manufacturers for investigation.		

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
8	Turbine Disc "Swash"	—	—	—	—	Not to exceed 0.006 total indicator clock reading.
9	Turbine Shroud Rear face distortion when free	0.010	0.030	—	—	Total indicator clock reading.
10	Turbine Blade and Inner Cone Axial clearance between trailing edge of turbine blade and rim of inner cone to be measured with the turbine blades pressed fully towards the front of the turbine disc	—	—	0.250 0.460	—	
11	Diaphragm Outer flange distortion	—	—	—	—	Not to exceed 0.020 total indicator clock reading.
12	Inner and Outer Joint Rings of Discharge Nozzles Fitting Assembly Rearward displacement of inner joint ring in relation to outer joint ring	—	—	—	—	Not to exceed 0.040 when free.
13	Nozzle and Turbine Blades Axial clearance between trailing edge of nozzle blade and leading edge of turbine blade to be measured with the turbine blades pressed fully towards the front of the turbine disc	At radius	of 12.675	0.375 0.625	—	For reference when measuring this clearance, the nominal width of the turbine blades is 1.380. Check at four positions. A maximum variation of 0.040 is permitted between any two readings
14	Turbine Shroud Lack of squareness (including waviness) of rear flange face measured on assembly	0.030	* 0.050	—	—	Total indicator clock readings. * Provided that the correct turbine tip clearance is obtained. See Ref. No. 7.
14a	Nozzle Blades Maximum amount of bowing permitted from the straight line of the leading (upstream) edge of each nozzle blade	—	0.006	—	—	Continued overleaf

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
14a (cont.)	Nozzle Blades (contd.) Maximum amount of bowing permitted from the straight line of the trailing (downstream) edge of each nozzle blade	in. —	in. 0.020	in. —	in. —	
14b	Nozzle Shroud Ovality of bore	—	0.030	—	—	Total indicator clock reading. The nozzle shroud may be trued in accordance with T.R.416 (in chapter 28F) if the ovality is in excess of that specified.
15	Turbine Disc Locking Washer (or Bolt Heads) and Rear Bearing Housing Assembly Minimum clearance between edge of turbine disc locking washer (or faces of bolt heads) and rear face of rear bearing housing assembly	—	—	0.090	—	To obtain this clearance (pre-mod. 910) the locking washer may be machined back flush with the heads of the turbine disc bolts.
16	Discharge Nozzles Joint Ring Joint ring—bore Joint ring bore—ovality	$\frac{8.250}{8.253}$ —	8.265 0.015	— —	— —	Maximum diameter of bore to be not greater than the permissible worn dimension.
17	Sealing Rings in Combustion Chamber Joint Ring Joint ring groove—width Sealing rings—overall width of both rings Sealing rings—gap	$\frac{0.102}{0.104}$ $\frac{0.096}{0.098}$ —	0.112 0.088 —	$\frac{0.004}{0.008}$ $\frac{0.020}{0.025}$	0.014 0.070	Measured in position.
18	Main Shaft Eccentricity (Turbine Disc End) and Extension Shaft Flange Eccentricity Total indicator clock readings at the following Stations:— J L	0.005 0.003	— —	— —	— —	Measured at final balance of rotative assembly comprising impeller, main shaft, extension shaft, turbine disc and blade assemblies. The location of Station J to be approximately as indicated on Fig. 7.

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
19	Turbine Disc Spigot in Hub Shaft					
	Standard spigot:—					
	Hub shaft—spigot bore	$\frac{4.4690}{4.4700}$	—	$\left. \begin{array}{l} -0.0015^* \\ 0.0000 \end{array} \right\}$	—	See chapter 28, T.R. 215 * It may be found on assembly that there is a slight positive clearance between the turbine disc spigot and the hub shaft spigot bore; a maximum clearance of 0.0005 is acceptable.
	Turbine disc—spigot diameter	$\frac{4.4700}{4.4705}$	—			
	0.005 undersize spigot:—					
	Hub shaft—spigot bore	$\frac{4.4640}{4.4650}$	—	$\left. \begin{array}{l} -0.0015^* \\ 0.0000 \end{array} \right\}$	—	
	Turbine disc—spigot diameter	$\frac{4.4650}{4.4655}$	—			
	0.010 undersize spigot:—					
	Hub shaft—spigot bore	$\frac{4.4590}{4.4600}$	—	$\left. \begin{array}{l} -0.0015^* \\ 0.0000 \end{array} \right\}$	—	
	Turbine disc—spigot diameter	$\frac{4.4600}{4.4605}$	—			
	0.015 undersize spigot:—					
	Hub shaft—spigot bore	$\frac{4.4540}{4.4550}$	—	$\left. \begin{array}{l} -0.0015^* \\ 0.0000 \end{array} \right\}$	—	
	Turbine disc—spigot diameter	$\frac{4.4550}{4.4555}$	—			
	0.020 undersize spigot:—					
	Hub shaft—spigot bore	$\frac{4.4490}{4.4500}$	—	$\left. \begin{array}{l} -0.0015^* \\ 0.0000 \end{array} \right\}$	—	
	Turbine disc—spigot diameter	$\frac{4.4500}{4.4505}$	—			
20	Turbine Disc Bolts in Turbine Disc Fitting Assembly					
	Standard fixing bolt holes:—					
	Bolt holes—diameter	$\frac{0.565}{0.570}$	*	$\left. \begin{array}{l} 0.003 \\ 0.010 \end{array} \right\}$	*	See chapter 28, T.R. 225 (pre-mod. 279) or T.R. 266 (mod. 279). * It is permissible to salvage both the extractor bolt holes either singly or together, up to a maximum of 0.020 oversize (0.590 diameter, pre-mod. 279 and 0.673 diameter mod. 279) plus one only
	Bolts—diameter of shoulders	$\frac{0.560}{0.562}$	—			
	Standard extractor bolt holes (pre-mod. 279):—					
	Bolt holes—diameter	$\frac{0.565}{0.570}$	*	$\left. \begin{array}{l} 0.003 \\ 0.010 \end{array} \right\}$	*	
	Bolts—diameter of shoulders	$\frac{0.560}{0.562}$	—			
						Continued overleaf

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
20 (contd.)	Turbine Disc Bolts in Turbine Disc Fitting Assembly (contd.)					of the remaining eight bolt holes up to a maxi- mum of 0.020 oversize (0.590 diameter) and fit standard bolts in these cases. If more than one of the eight fixing bolt holes needs salvaging in addition to the two ex- tractor bolt holes, then all of the eight fixing bolt holes are to be modified similarly and an appro- priate oversize bolt fitted. When extractor bolt holes are salvaged, oversize eccentric nuts to T.R. 252 (see chapter 28) are to be fitted (see Ref. No. 21). The tightening torque for standard and oversize turbine disc bolts is to be 850/950 lb. in. using L.M. Ragazine paste.
	Standard extractor bolt holes (mod. 279):—					
	Bolt holes—diameter	$\frac{0.650}{0.653}$	$\frac{*}{—}$	$\frac{0.015}{0.023}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.630}{0.635}$	$\frac{—}{—}$			
	0.005 oversize fixing bolt holes:—					
	Bolt holes—diameter	$\frac{0.570}{0.575}$	$\frac{*}{—}$	$\frac{0.003}{0.010}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.565}{0.567}$	$\frac{—}{—}$			
	0.005 oversize extractor bolt holes (pre-mod. 279 only):—					
	Bolt holes—diameter	$\frac{0.570}{0.575}$	$\frac{*}{—}$	$\frac{0.008}{0.015}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.560}{0.562}$	$\frac{—}{—}$			
	0.010 oversize fixing bolt holes:—					
	Bolt holes—diameter	$\frac{0.575}{0.580}$	$\frac{*}{—}$	$\frac{0.003}{0.010}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.570}{0.572}$	$\frac{—}{—}$			
	0.010 oversize extractor bolt holes (pre-mod. 279):—					
	Bolt holes—diameter	$\frac{0.575}{0.580}$	$\frac{*}{—}$	$\frac{0.013}{0.020}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.560}{0.562}$	$\frac{—}{—}$			
	0.010 oversize extractor bolt holes (mod. 279):—					
	Bolt holes—diameter	$\frac{0.660}{0.663}$	$\frac{*}{—}$	$\frac{0.025}{0.033}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.630}{0.635}$	$\frac{—}{—}$			

Continued on facing page

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
20 (contd.)	Turbine Disc Bolts in Turbine Disc Fitting Assembly (contd.)					
	0-015 oversize fixing bolt holes:—					* Refer to the other pages containing Ref. No. 20.
	Bolt holes—diameter	$\frac{0.580}{0.585}$	$\frac{*}{—}$	$\frac{0.003}{0.010}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.575}{0.577}$	$\frac{—}{—}$			
	0-015 oversize extractor bolt holes (pre-mod. 279 only):—					
	Bolt holes—diameter	$\frac{0.580}{0.585}$	$\frac{*}{—}$	$\frac{0.018}{0.025}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.560}{0.562}$	$\frac{—}{—}$			
	0-020 oversize fixing bolt holes:—					
	Bolt holes—diameter	$\frac{0.585}{0.590}$	$\frac{*}{—}$	$\frac{0.003}{0.010}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.580}{0.582}$	$\frac{—}{—}$			
	0-020 oversize extractor bolt holes (pre-mod. 279):—					
	Bolt holes—diameter	$\frac{0.585}{0.590}$	$\frac{*}{—}$	$\frac{0.023}{0.030}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.560}{0.562}$	$\frac{—}{—}$			
	0-020 oversize extractor bolt holes (mod. 279):—					
	Bolt holes—diameter	$\frac{0.670}{0.673}$	$\frac{*}{—}$	$\frac{0.035}{0.043}$	$\frac{*}{—}$	
	Bolts—diameter of shoulders	$\frac{0.630}{0.635}$	$\frac{—}{—}$			
21	Turbine Disc Eccentric Nuts in Turbine Disc					
	Standard size:—					
	Bolt holes—diameter for eccentric nuts	$\frac{0.6500}{0.6530}$	$\frac{—}{—}$	$\frac{-0.0035}{0.0000}$	$\frac{—}{—}$	
	Eccentric nuts—locating diameter	$\frac{0.6530}{0.6535}$	$\frac{—}{—}$			

Continued overleaf

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
21 (<i>contd.</i>)	Turbine Disc Eccentric Nuts in Turbine Disc (<i>contd.</i>)					
	1st oversize:—					
	Bolt holes—diameter for eccentric nuts	$\frac{0.6600}{0.6630}$	—	$\frac{-0.0035}{0.0000}$	—	See chapter 28, T.R. 252. Holes for eccentric nuts may be modified singly or together as required
	Eccentric nuts—locating diameter	$\frac{0.6630}{0.6635}$	—			
	2nd oversize:—					
	Bolt holes—diameter for eccentric nuts	$\frac{0.6700}{0.6730}$	—	$\frac{-0.0035}{0.0000}$	—	
	Eccentric nuts—locating diameter	$\frac{0.6730}{0.6735}$	—			
22	Nozzle Ring Assembly					
	Relative distortion between rear flange of turbine shroud and forward flange of nozzle shroud	—	0.050	—	—	This distortion is determined as follows:— The distance between the inside edges of the two flanges to be measured at each of the nozzle strut positions (Y) and at each of the ten positions mid-way or closely approximating to mid-way between the struts (X). The difference between any two adjacent dimensions (Y—X) will be the relative distortion and the greatest difference the maximum relative distortion (see Fig. 7).
23	Nozzle Ring Assembly					
	Eccentricity of the centres of the discharge nozzles when assembled to nozzle ring	—	+0.018 —0.030	Indicator clock reading as measured by means of Tool No. T.72853. If the centres are found to be outside the maximum limit, they may be adjusted in position by means of the nozzle retaining straps. If any nozzle is displaced inwards more than 0.018 (but not more than 0.030), the relevant retaining strap must be set to ensure concentricity within ± 0.018 of the nominal centre in the outward loaded condition of normal operation.		

Centre Casing

Dimensional checks of the centre casing are no longer required, and, therefore, the information and the illustration, which were printed previously on this page, have been deleted.

Exhaust System — pre-mod. 187 (Ghost 48 Mk. 1) (Fig. 9)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
1	Exhaust Cones Assembly Radial clearance between fairings and inner cone	—	—	$\frac{0.060}{0.180}$	$\frac{0.060}{0.200}$	
2	Exhaust Cones Assembly Eccentricity of bullet end of inner cone measured 2 in. from apex	0.100	0.200	—	—	Provided the specified clearance between turbine blade and inner cone is maintained. Total indicator clock readings.
3	Exhaust Cones Assembly Eccentricity of base diameter of inner cone	—	0.075	—	—	Total indicator clock readings.

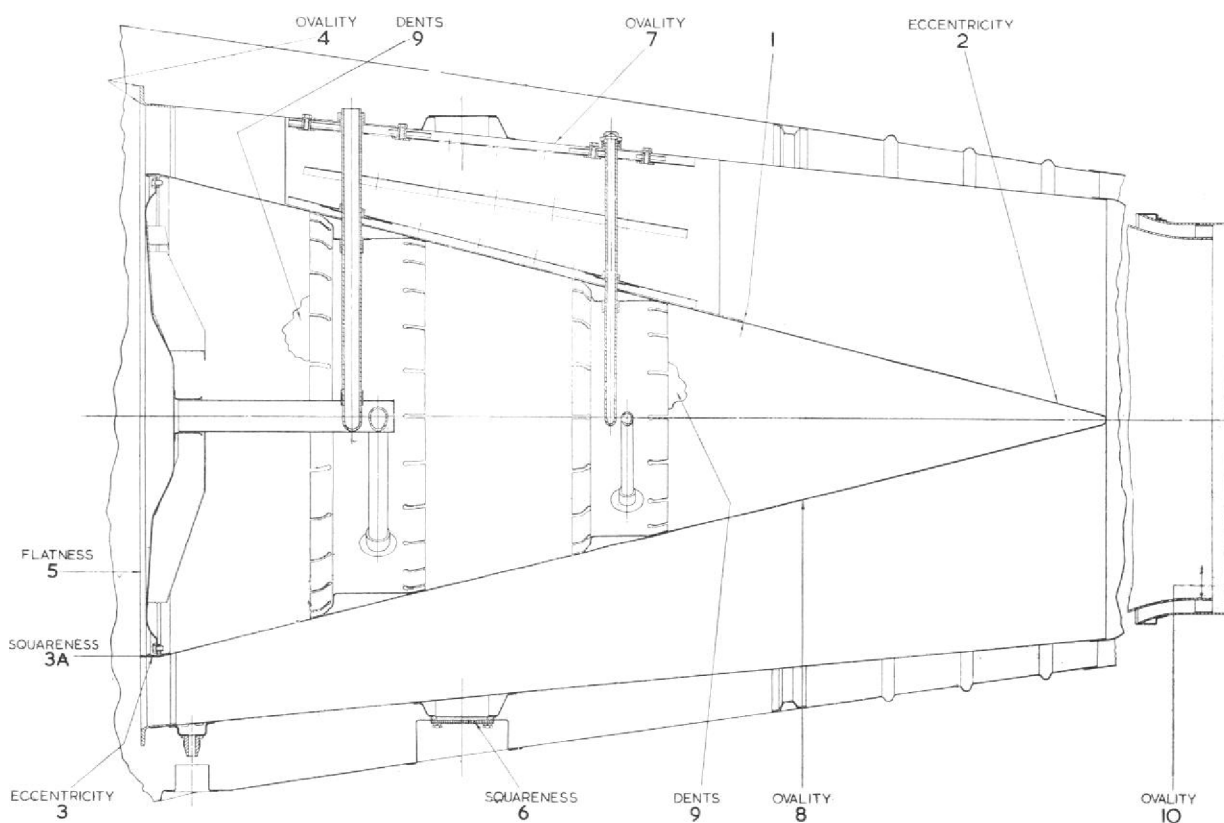


Fig. 9. Exhaust system (Ghost 48 Mk. 1), pre-mod. 187.

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September, 1954

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
3a	Exhaust Cones Assembly Lack of squareness of base of inner cone	—	0.050	—	—	Total indicator clock reading. Provided the specified clearance be- tween turbine blade and inner cone is maintained.
4	Outer Exhaust Cone Ovality of inside and outside diameters of front flange	0.030	0.050	—	—	
5	Outer Exhaust Cone Flatness of front flange	0.020	0.030	—	—	
6	Outer Exhaust Cone Lack of parallelism of heater muff flanges with axis of exhaust cones Maximum twist of heater muff flanges either side of centre line as viewed from apex of inner cone	0.030 —	0.040 0.050	— —	— —	
7	Outer Exhaust Cone Ovality of sheet metal portion	0.150	0.200	—	—	Total indicator clock readings.
8	Inner Exhaust Cone Ovality of sheet metal portion	0.100	0.160	—	—	Total indicator clock readings.
9	Inner Exhaust Cone Dents in sheet metal portion	—	—	—	—	Dents are permitted as follows:— (a) In the vicinity of the larger diaphragm (i.e. towards the base of the cone) the maximum depth of each dent to be 0.25 in. and the maximum area covered by each dent to be 25 sq. in. (b) In the vicinity of the smaller diaphragm (i.e. towards the apex of the cone) the maximum depth of each dent to be 0.125 in. and the maximum area covered by each dent to be 15 sq. in.
10	Propelling Nozzle Inside diameter—ovality	0.060	0.125	—	—	

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July, 1956

Exhaust System (Ghost 48 Mk. 1 and 2) (Fig. 9a — mod. 187, 290, 362 and 540)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
1	Exhaust Cones Assembly Radial clearance between fairings and inner cone	—	—	$\frac{0.060}{0.180}$	$\frac{0.060}{0.200}$	
2	Exhaust Cones Assembly Eccentricity of bullet end of inner cone measured 2 in. from apex	0.100	0.200	—	—	Provided the specified clearance between turbine blade and inner cone is maintained. Total indicator clock readings.
3	Exhaust Cones Assembly Eccentricity of base diameter of inner cone	—	0.075	—	—	Total indicator clock readings.

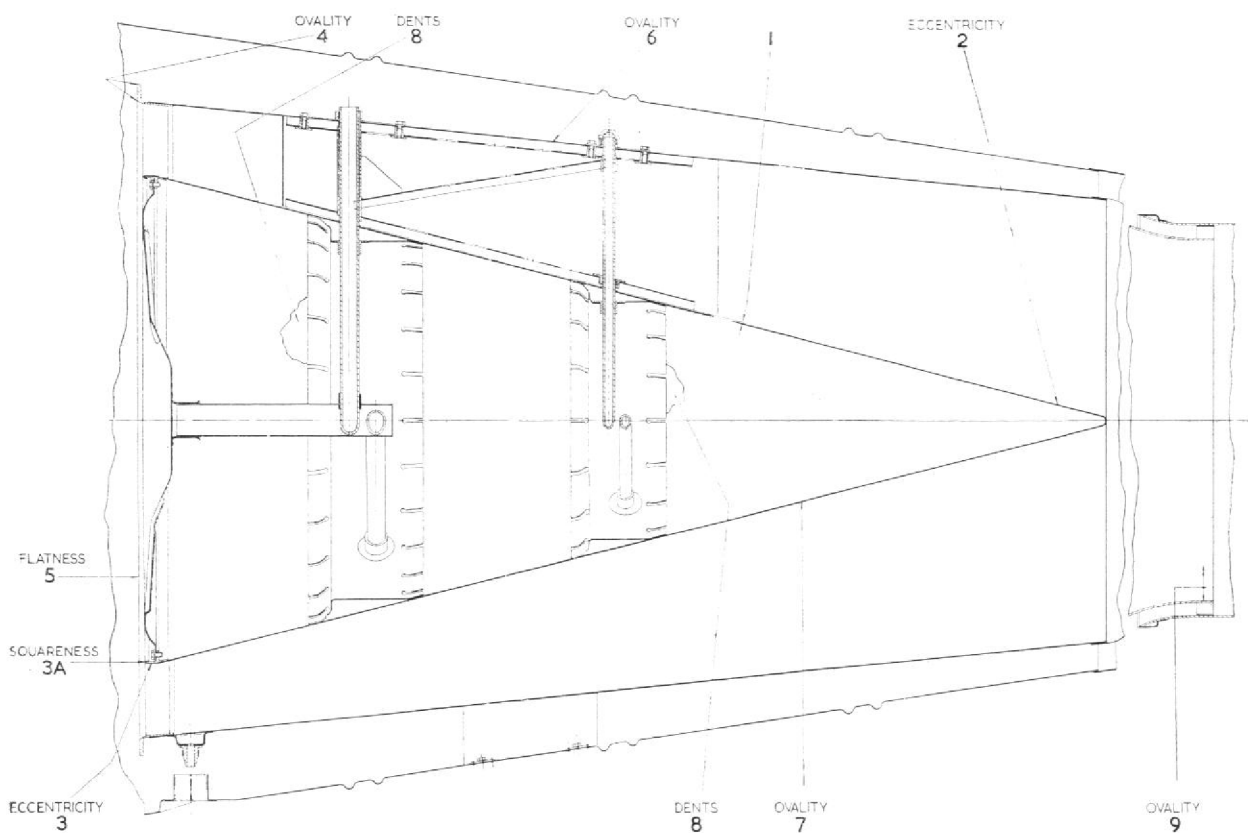


Fig. 9a. Exhaust system (Ghost 48 Mk. 1 and 2), mod. 187, 290, 362, and 540.

Revised by Amendment No. 114

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
3a	Exhaust Cones Assembly Lack of squareness of base of inner cone	—	0.050	—	—	Total indicator clock reading. Provided the specified clearance be- tween turbine blade and inner cone is maintained.
4	Outer Exhaust Cone Ovality of inside and outside diameters of front flange	0.030	0.050	—	—	
5	Outer Exhaust Cone Flatness of front flange	0.020	0.030	—	—	
6	Outer Exhaust Cone Ovality of sheet metal portion	0.150	0.200	—	—	Total indicator clock readings.
7	Inner Exhaust Cone Ovality of sheet metal portion	0.100	0.160	—	—	Total indicator clock readings.
8	Inner Exhaust Cone Dents in sheet metal portion	—	—	—	—	Dents are permitted as follows:— (a) In the vicinity of the larger diaphragm (i.e. towards the base of the cone) the maximum depth of each dent to be 0.25 in. and the maximum area covered by each dent to be 25 sq. in. (b) In the vicinity of the smaller diaphragm (i.e. towards the apex of the cone) the maximum depth of each dent to be 0.125 in. and the maximum area covered by each dent to be 15 sq. in.
9	Propelling Nozzle Inside diameter—ovality	0.060	0.125	—	—	

Fuel Control Valves (Ghost 48 Mk. 1) (Fig. 10)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
1	Throttle Valve in Throttle Valve Sleeve					
	Valve sleeve—bore	$\frac{0.5000}{0.5005}$	0.5022	$\frac{0.0003}{0.0011}$	0.0025	
	Throttle valve—outside diameter	$\frac{0.4994}{0.4997}$	0.4975			
2	Cut-off Valve in Cut-off Valve Sleeve					
	Valve sleeve—bore	$\frac{0.5000}{0.5005}$	0.5022	$\frac{0.0003}{0.0011}$	0.0025	
	Cut-off valve—outside diameter	$\frac{0.4994}{0.4997}$	0.4975			

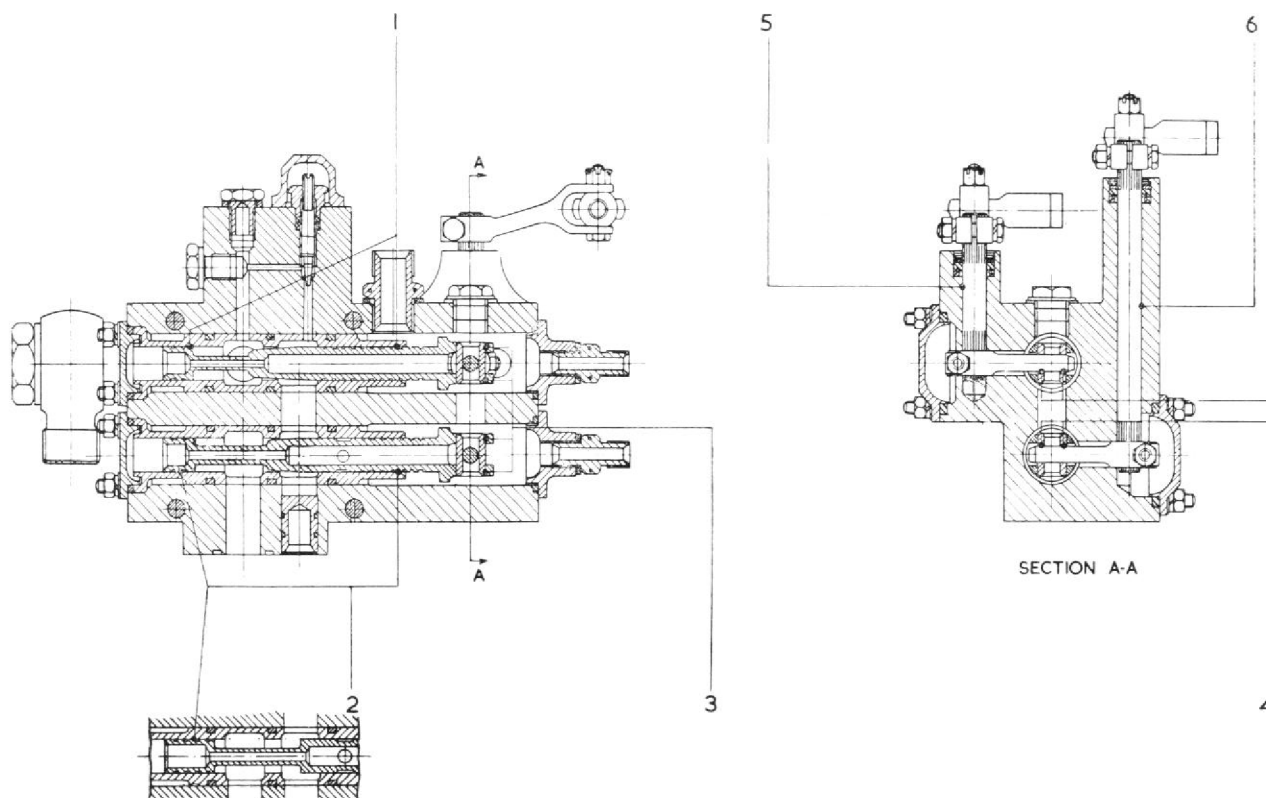


Fig. 10. Fuel control valves (Ghost 48 Mk. 1).

Revised by Amendment No. 114
September, 1954

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
3	Trunnion in Cut-off and Throttle Valves					
	Valve—bore	$\frac{0.4375}{0.4380}$	0.4935	$\frac{0.0005}{0.0015}$	0.0025	
	Trunnion—outside diameter	$\frac{0.4365}{0.4370}$	0.435			
4	Operating Levers in Cut-off and Throttle Valve Trunnion					
	Trunnion—bore	$\frac{0.2500}{0.2505}$	0.2525	$\frac{0.0005}{0.0020}$	0.003	
	Operating lever—spigot diameter	$\frac{0.2485}{0.2495}$	0.247			
5	Throttle Valve Control Shaft in Valve Body					
	Valve body—bore	$\frac{0.3750}{0.3755}$	0.378	$\frac{0.0020}{0.0035}$	0.005	
	Control shaft—diameter	$\frac{0.3720}{0.3730}$	0.370			
6	Cut-off Valve Control Shaft in Valve Body					
	Valve body—bore	$\frac{0.3750}{0.3755}$	0.378	$\frac{0.0020}{0.0035}$	0.005	
	Control shaft—diameter	$\frac{0.3720}{0.3730}$	0.370			

Combustion Chamber (Type 4, Ghost 48 Mk. 1 only)
(Fig. 11 — pre-mod. 293 and Fig. 11a — mod. 293 pre-mod 437)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Locating Plug in Flame Tube Suspension Sleeve					
	Sleeve—bore	$\frac{0.831}{0.833}$	0.840*	$\frac{0.005}{0.009}$	0.014	* Provided that the wall thickness of the suspension sleeve is not less than 0.040. The maximum diameter of sleeve bore to be not greater than the Permissible Worn Dimension.
	Locating plug—outside diameter	$\frac{0.824}{0.826}$	Not permitted			
	Sleeve—ovality of bore	—	0.009	—	—	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
2	Burner Projection Projection of burner beyond rear face of swirler inner sleeve	$\frac{0.250}{0.300}$	—	—	—	Adjustable by adjusting washers situated beneath burner diaphragm. Nominal thickness of each washer is 0.050.
3	Burner Shroud in Swirler Swirler assembly—bore	$\frac{1.073}{1.077}$	1.083	$\frac{0.011}{0.017}$	0.021	* Wear is permitted locally on the outside diameter of the burner shroud at the swirler bore location, to the extent of 0.008 maximum depth. The minimum dimension measured across the diameter of the burner shroud where the maximum depth of wear occurs is to be 1.052.
	Burner shroud—outside diameter	$\frac{1.060}{1.062}$	*			
3a	Expansion Chamber Plunger Spring Pre-mod. 293 (Fig. 11) Test length	$\frac{0.750}{43.5 \text{ lb.}}$	—	—	—	Spring to be inspected visually for defects.
	Equivalent load	$\frac{48.5 \text{ lb.}}$				
	Mod. 293 (Fig. 11a) Test length	$\frac{1.125}{40.5 \text{ lb.}}$				
	Equivalent load	$\frac{49.5 \text{ lb.}}$				

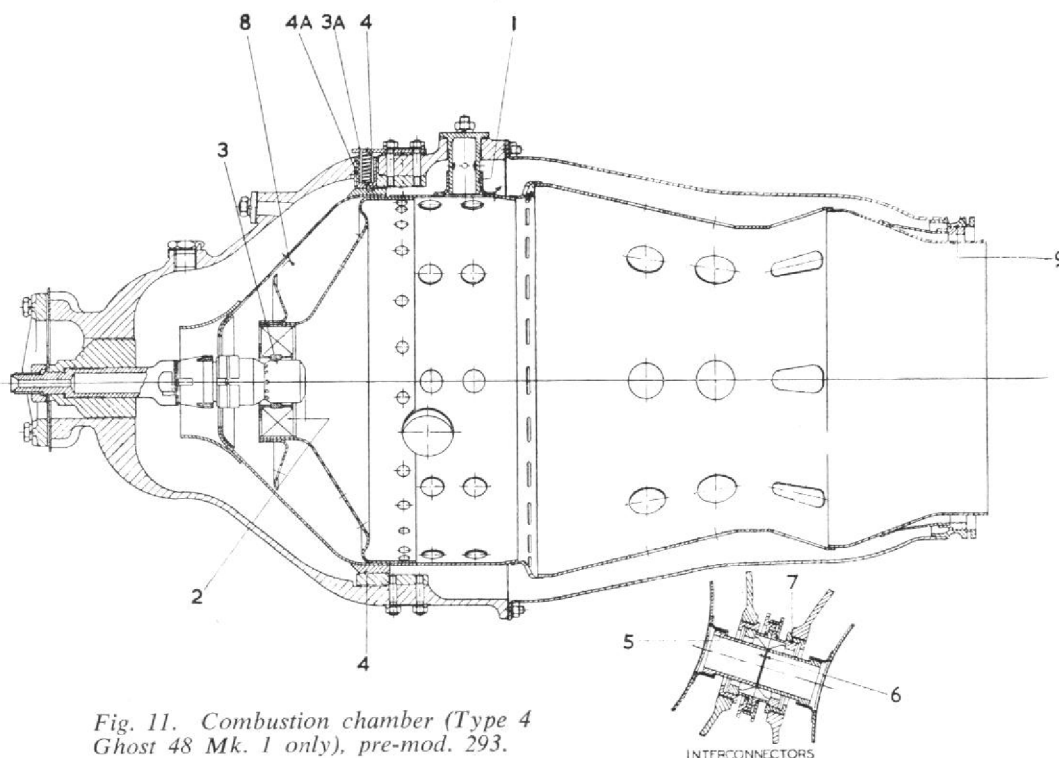


Fig. 11. Combustion chamber (Type 4
Ghost 48 Mk. 1 only), pre-mod. 293.

Revised by Amendment No. 116
February, 1955

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
4	Flame Tube Locating Pads in Expansion Cham- ber Support Pads					
	Flame tube locating pads —depth of wear, inden- tation or depression of flame tube skin	—	0-010	—	—	Provided that the diam- eter over the locating pads is not less than 9-864 ignoring depth of wear at the plunger locations.
	Expansion chamber sup- port pads — depth of wear	—	0-002	—	—	If wear exceeds 0-002 support pads may be sal- vaged to T.R.339, chapter 30.
	Projection of plunger beyond inner face of guide block when plun- ger flange is bottoming on outer face of guide block	—	0-062 Min.	—	—	Pre-mod. 293 only. Measured prior to fitting flame tube. See Fig. 11.

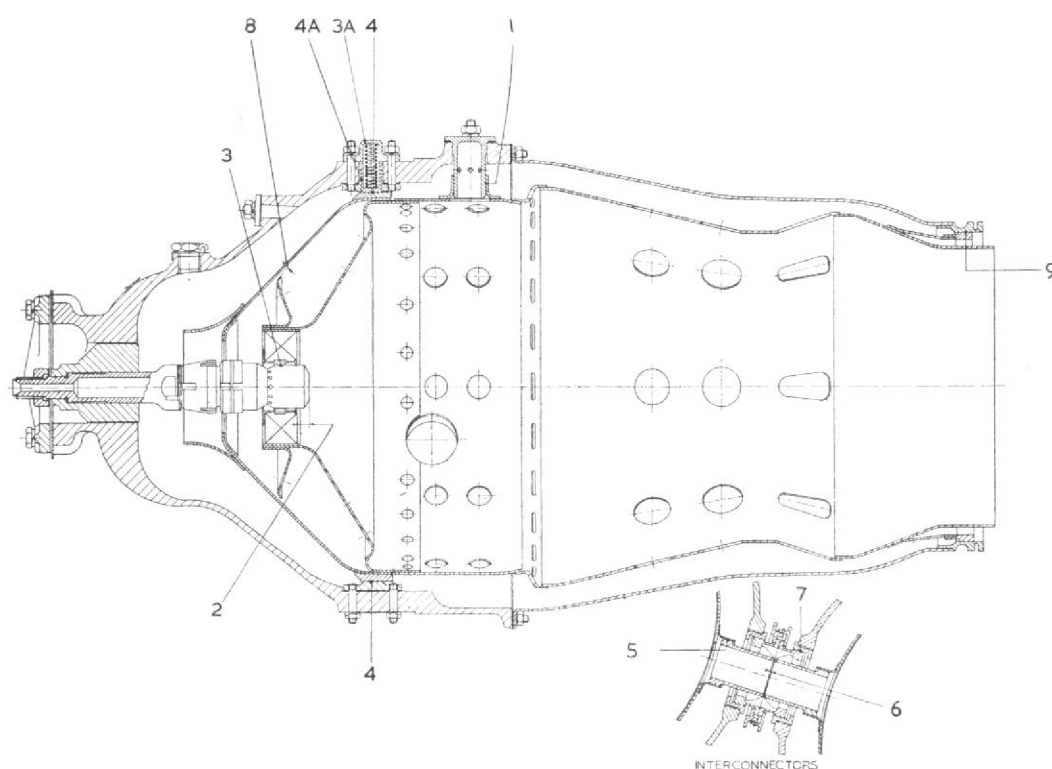


Fig. 11a. Combustion chamber (Type 4, Ghost 48 Mk. 1 only), mod. 293, pre-mod. 437.

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
4a	Expansion Chamber Plungers in Guide Blocks or Bushes					
	Guide block or bush— bore	$\frac{0.5000}{0.5008}$	0.505	$\frac{0.0010}{0.0033}$	0.006	See Fig. 11 for guide block (pre-mod. 293) and Fig. 11a for bush (mod. 293).
	Plunger—outside diameter	$\frac{0.4975}{0.4990}$	0.494	—	—	Maximum diameter of guide block or bush bore to be not greater than the Permissible Worn Dimension.
	Guide block or bush— ovality of bore	—	0.005	—	—	
5	Interconnector Inner Sleeves in Flame Tube Sleeves					
	Flame tube sleeve—bore	$\frac{1.200}{1.202}$	1.211 [*]	$\frac{0.001}{0.008}$	0.012	* Local wear is permitted in the flame tube sleeve bore provided that the wall thickness of the flame tube sleeve is nowhere less than 0.030 and the Permissible Worn Dimension for flame tube sleeve bore is not exceeded.
	Interconnector inner sleeve — spherical dia- meter	$\frac{1.194}{1.199}$	1.188	—	—	
6	Interconnector Inner Sleeves in Outer Sleeves, End Float					
	Outer sleeves — overall depth of recess on any two combined sleeves	$\frac{0.850}{0.860}$	0.900	$\frac{0.010}{0.040}$	0.060	
	Inner sleeves — overall length of lugs on any two combined sleeves	$\frac{0.820}{0.840}$	0.790	—	—	
7	Interconnector Outer Sleeves in Expansion Chamber Bushes					
	Bush—bore	$\frac{1.7500}{1.7510}$	1.754	$\frac{0.0003}{0.0023}$	0.0043	
	Outer sleeve—spherical diameter	$\frac{1.7487}{1.7497}$	1.746	—	—	
8	Flame Tube Scoop and Grid					
	Clearance between flame tube scoop and grid as indicated on Fig. 11 and 11a	$\frac{0.080}{0.100}$	—	—	—	To facilitate measurement of this clearance on engines at mod. 340 standard and subsequently there are three inspection holes drilled equidistantly in the scoop. Measurement of the clearance pre-mod. 340 may be effected through the flame tube snout.

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
9	Flame Tube Rear Locating Muff in Rear Outer Casing Joint Ring					* If it is found on inspection that the wall thickness between the diameter of the bore and the bottom of the sealing groove on the joint ring is less than 0.032, then the rear outer casing fitting assembly must be considered unserviceable.
	Joint ring—bore	$\frac{7.800}{7.805}$	$\frac{*}{—}$	—	—	
	Locating muff—spherical diameter	$\frac{7.772}{7.775}$	$\frac{7.765}{—}$	—	—	

Combustion Chamber (Type 5, Ghost 48 Mk. 1 and 2)
(Fig. 11b — mod. 437, 712, 722, 743, 825, 901, 987 and 1113)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Locating Plug in Flame Tube Suspension Sleeve					* Provided that the wall thickness of the suspension sleeve is not less than 0.040. The maximum diameter of sleeve bore to be not greater than the Permissible Worn Dimension.
	Sleeve—bore	$\frac{0.831}{0.833}$	$\frac{0.840}{—}$	$\frac{0.005}{0.009}$	0.014	
	Locating plug—outside diameter	$\frac{0.824}{0.826}$	Not permitted	—	—	
	Sleeve—ovality of bore	—	0.009	—	—	
2	Burner Projection Projection of burner beyond rear face of swirler inner sleeve	$\frac{0.050}{0.100}$	—	—	—	Adjustable by adjusting washers situated beneath burner diaphragm. Nominal thickness of each washer is 0.050. Not more than 3 washers may be fitted to any one chamber.
3	Burner Shroud in Swirler Swirler inner sleeve—bore	$\frac{1.069}{1.073}$	1.079	$\frac{0.007}{0.013}$	0.017	* Wear is permitted locally on the outside diameter of the burner shroud at the swirler bore location, to the extent of 0.008 maximum depth. The minimum dimension measured across the diameter of the burner shroud where the maximum depth of wear occurs is to be 1.052.
	Burner shroud—outside diameter	$\frac{1.060}{1.062}$	*	—	—	
3a	Expansion Chamber Plunger Spring					Spring to be inspected visually for defects.
	Test length	1.125	—	—	—	
	Equivalent load	$\frac{40.5 \text{ lb.}}{49.5 \text{ lb.}}$	—	—	—	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
4	Flame Tube Locating Pads in Expansion Chamber Support Pads					Provided that the radius over the locating pads is not less than 4.6130.
	Flame tube locating pads—depth of wear, indentation or depression of flame tube skin	—	0.010	—	—	
	Expansion chamber support pads—depth of wear	—	0.002	—	—	If wear exceeds 0.002 support pads may be salvaged to T.R.339, chapter 30.
5	Expansion Chamber Plungers in Bushes (mod. 437) or Guide Blocks (mod. 743)					Maximum diameter of bush or guide block to be not greater than the Permissible Worn Dimension.
	Bush or guide block—bore	0.5000 0.5008	0.505	0.0010 0.0033	0.006	
	Plunger—outside diameter	0.4975 0.4990	0.494			
	Bush or guide block—ovality of bore	—	0.005	—	—	

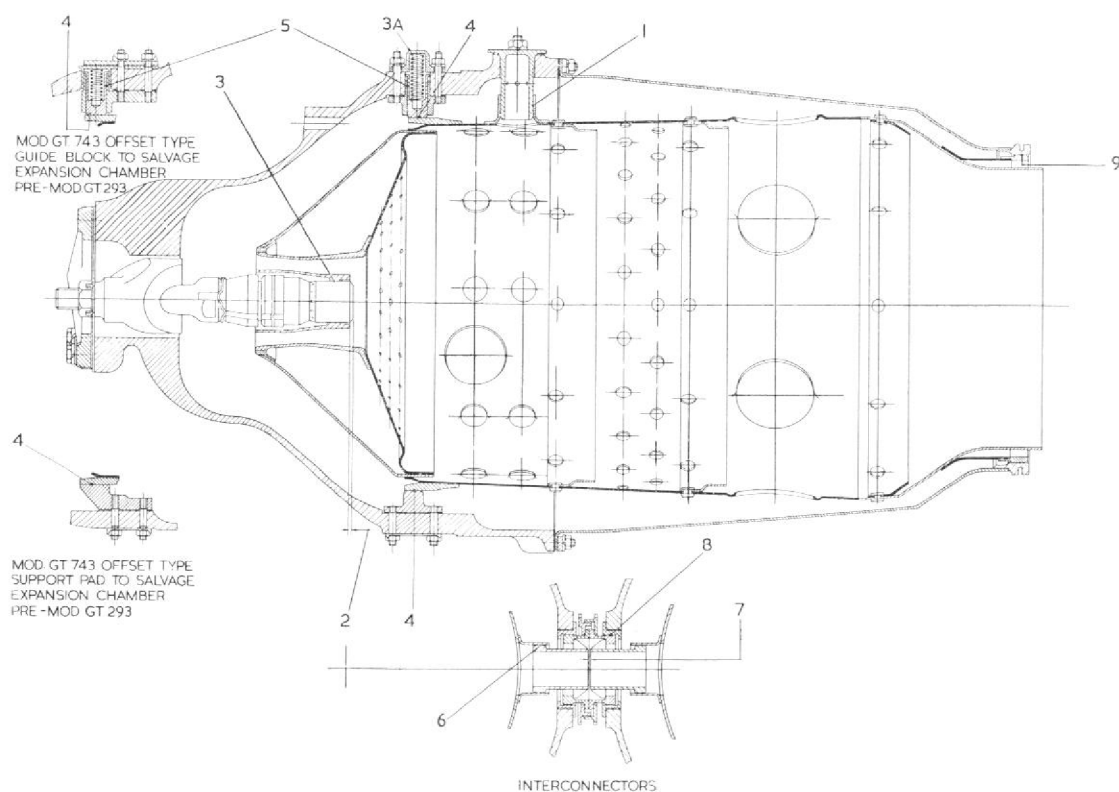


Fig. 11b. Combustion chamber (Type 5 Ghost 48 Mk. 1 and 2), mod. 437, 712, 722, 743, 825, 901, 987, and 1113.

Revised by Amendment No. 127
October, 1956

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
6	Interconnector Inner Sleeves in Flame Tube Sleeves					* Local wear is permitted in the flame tube sleeve bore provided that the wall thickness of the flame tube sleeve is no- where less than 0.030 and the Permissible Worn Dimension for flame tube sleeve bore is not ex- ceeded.
	Flame tube sleeve—bore	$\frac{1.200}{1.202}$	$\frac{1.211^*}{1.188}$	$\frac{0.001}{0.008}$	0.012	
	Interconnector inner sleeve — spherical dia- meter	$\frac{1.194}{1.199}$				
7	Interconnector Inner Sleeves in Outer Sleeves, End Float					
	Outer sleeves—overall depth of recess on any two combined sleeves	$\frac{0.850}{0.860}$	$\frac{0.900}{0.790}$	$\frac{0.010}{0.040}$	0.060	
	Inner sleeves — over- all length of lugs on any two combined sleeves	$\frac{0.820}{0.840}$				
8	Interconnector Outer Sleeves in Expansion Chamber Bushes					
	Bush—bore	$\frac{1.7500}{1.7510}$	1.754	$\frac{0.0003}{0.0023}$	0.0043	
	Outer sleeve—spherical diameter	$\frac{1.7487}{1.7497}$	1.746			

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
9	Flame Tube Rear Locating Muff in Rear Outer Casing Joint Ring					If it is found on inspection that the wall thickness between the diameter of the bore and the bottom of the sealing ring groove on the joint ring is less than 0.040, then the rear outer casing fitting assembly must be considered unserviceable. If the spherical outside diameter of the locating muff has become damaged or worn beyond the Permissible Worn Dimension, the flame tube and head fitting assembly may be salvaged in accordance with T.R.353, chapter 30.
	Joint ring—bore	$\frac{7.715}{7.725}$	7.730	—	—	
	Locating muff—spherical diameter	$\frac{7.687}{7.690}$	7.685			
	Locating muff—spherical diameter—ovality total indicator clock reading	—	0.010	—	—	

Hydraulic Pump Drive (Ghost 48 Mk. 1 in Sea Venom only) (Fig. 11c)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Quillshaft in Spur Gear and Sleeve, Spline Backlash					
	Spur gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Quillshaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			

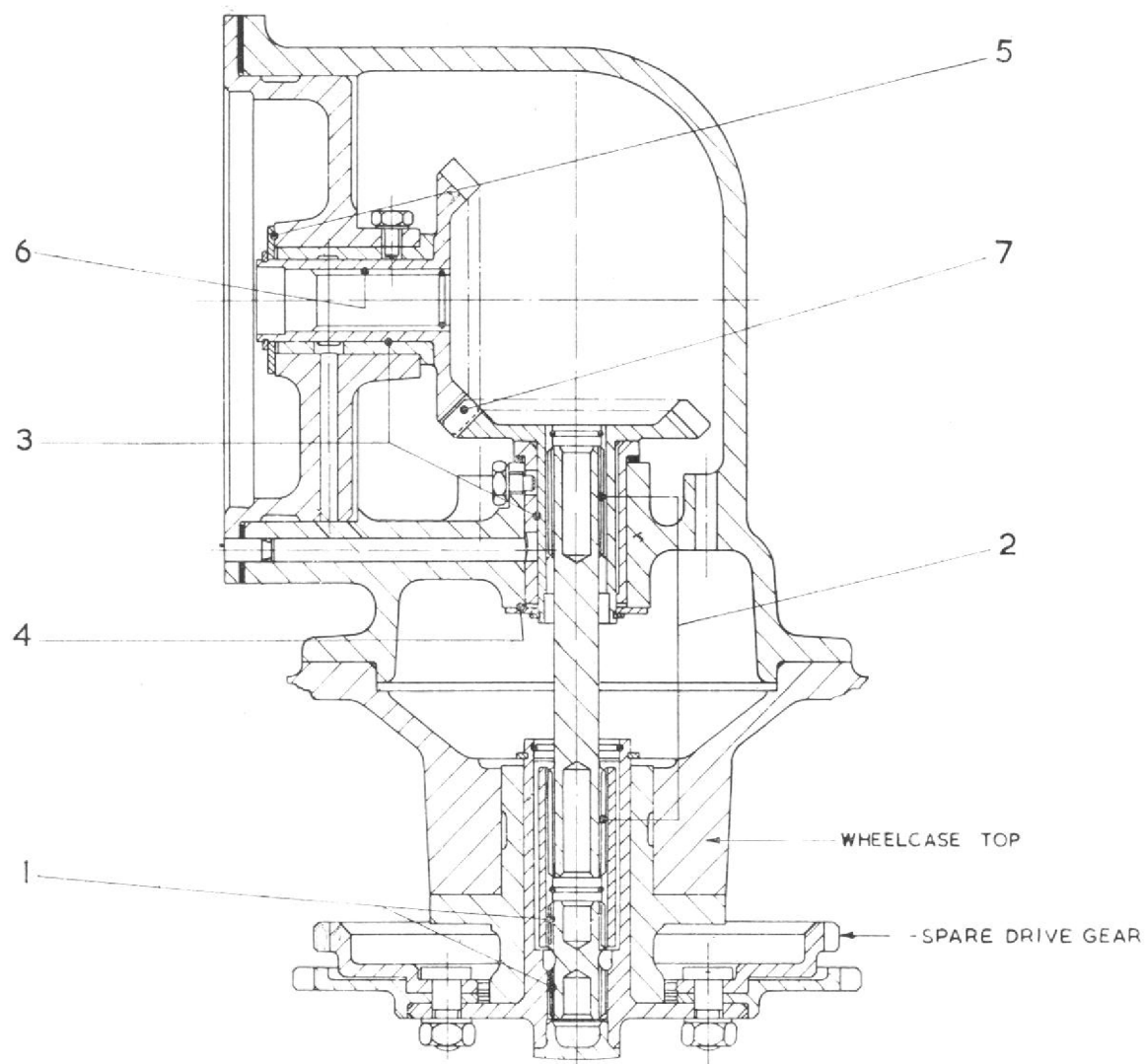


Fig. 11c. Hydraulic pump drive (Ghost 48 Mk. 1 in Sea Venom only).



Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
2	Driving Shaft in Bevel Gear and Sleeve, Spline Backlash					
	Bevel gear and sleeve—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	$\frac{0.0015}{0.0045}$	0.007	
	Driving shaft—width of splines	$\frac{0.1220}{0.1235}$	0.118			
3	Bevel Gears in Bushes					
	Bush—bore	$\frac{0.6875}{0.6880}$	0.6905	$\frac{0.0015}{0.0025}$	0.0045	
	Bevel gear shank—outside diameter	$\frac{0.6855}{0.6860}$	0.683			
4	Vertical Bevel Gear					
	End float	—	—	$\frac{0.0027}{0.0256}$	0.036	The end float is measured as the clearance between the washer and the housing as indicated on diagram.
5	Horizontal Bevel Gear					
	End float	—	—	$\frac{0.0026}{0.0306}$	0.040	The end float is measured as the clearance between the washer and the adapter as indicated on diagram.
6	Hydraulic Pump Shaft in Bevel Gear					
	Bevel gear—width of splineways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
7	Bevel Gears					
	Backlash	—	—	$\frac{0.005}{0.011}$	0.015	Adjustable by means of the following shims:— One situated beneath the hydraulic pump adapter flange and another beneath the hydraulic pump drive housing bush flange, both 0.060 nominal thickness, half solid and half shims or all laminated in 0.002 or 0.003 increments.

Air-Intake (Ghost 48 Mk. 2) (Fig. 12)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
1	Ball and Roller Bearings in Upper Driving Gear Bearing Housing					
	Housing—bore	$\frac{3.5615}{3.5622}$	3.5632	$\frac{-0.0002}{+0.0010}$	+ .0015	
	Bearings—outside diameter	$\frac{3.5612}{3.5617}$	3.5600			
2	Upper Driving Gear Ball Bearing					
	End float between inner and outer races	—	—	$\frac{0.0055}{0.0086}$	0.012	
3	Upper Driving Gear Roller Bearing					
	Diametral clearance between rollers and outer race	—	—	$\frac{0.0010}{0.0015}$	0.0025	
4	Upper Vertical Driving Shaft in Starter Dog, Serration Backlash					
	Starter dog serrations—dimension between parallel faces	$\frac{0.7038}{0.7053}$	0.711	$\frac{0.0008}{0.0055}$	0.008	
	Driving shaft serrations—dimension over parallel faces	$\frac{0.6998}{0.7030}$	0.6958			
5	Ball and Roller Bearings in Lower Driving Gear Bearing Housing					
	Housing—bore	$\frac{2.0465}{2.0471}$	—	$\frac{-0.0007}{+0.0004}$	Not permitted	
		$\frac{51,981 \text{ mm.}}{51,996 \text{ mm.}}$	—	$\frac{-0.019 \text{ mm.}}{+0.009 \text{ mm.}}$		
	Bearings—outside diameter	$\frac{2.0467}{2.0472}$	—			
		$\frac{51,987 \text{ mm.}}{52,000 \text{ mm.}}$	—			
6	Lower Driving Gear Ball Bearing					
	End float between inner and outer races	—	—	$\frac{0.005}{0.002}$ $\frac{0.002}{0.004}$	$\frac{0.007}{0.006}$	Hoffman type No. 125. Ransome and Marles type LJ.25.

Revised by Amendment No. 126
August, 1956

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
7	Lower Driving Gear Roller Bearing			$\frac{0.0010}{0.0015}$	0.002	Hoffman type No. R.125 or R.125.V2.
	Diametral clearance between rollers and outer race	—	—	$\frac{0.0008}{0.0012}$	0.002	Ransome and Marles type LRJ.25.

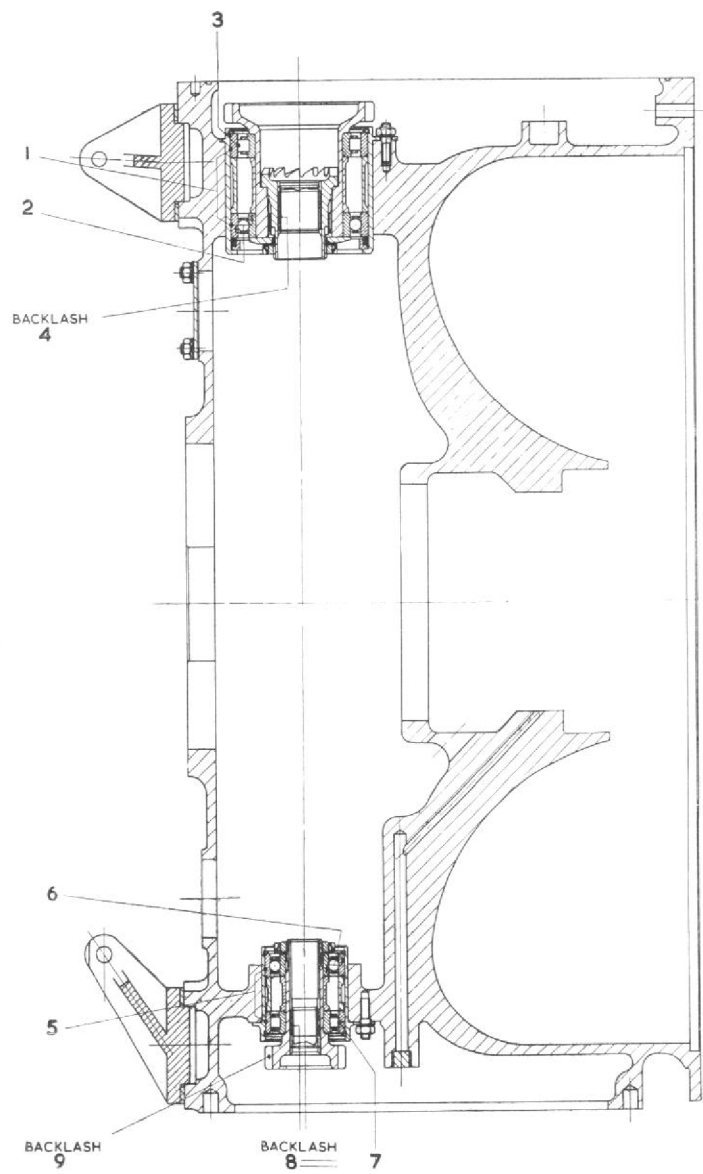


Fig. 12. Air-intake (Ghost 48 Mk. 2)

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
8	Lower Vertical Driving Shaft in Lower Driving Gear, Serration Backlash Lower driving gear serrations—dimension between parallel faces Driving shaft serrations—dimension over parallel faces	$\frac{0.4577}{0.4589}$ $\frac{0.4545}{0.4571}$	0.4641 0.4507	$\frac{0.0006}{0.0044}$	0.007	
9	Lower Driving Gear and Accessory Drives Idler Gear Backlash	—	—	$\frac{0.004}{0.012}$	0.017	

Top Wheelcase (Ghost 48 Mk. 2) (Fig. 13)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Generator Drive Gear Roller Bearing in Housing Housing—bore Roller bearing—outside diameter	$\frac{2.0470}{2.0476}$ $\frac{51,994 \text{ mm.}}{52,009 \text{ mm.}}$ $\frac{2.0467}{2.0472}$ $\frac{51,987 \text{ mm.}}{52,000 \text{ mm.}}$	2.0485 52,033 mm. 2.0457 51,961 mm.)	 $\frac{-0.0002}{+0.0009}$ $\frac{-0.006 \text{ mm.}}{+0.022 \text{ mm.}}$	 +0.0013 +0.033 mm.	
2	Generator Drive Roller Bearing Diametral clearance between rollers and outer races	—	—	$\frac{0.0010}{0.0015}$ $\frac{0.0008}{0.0012}$	0.002 0.002	Hoffman type No. R.125 or R.125.V2. Ransome and Marles type LRJ.25.

Revised by Amendment No. 137
April, 1958

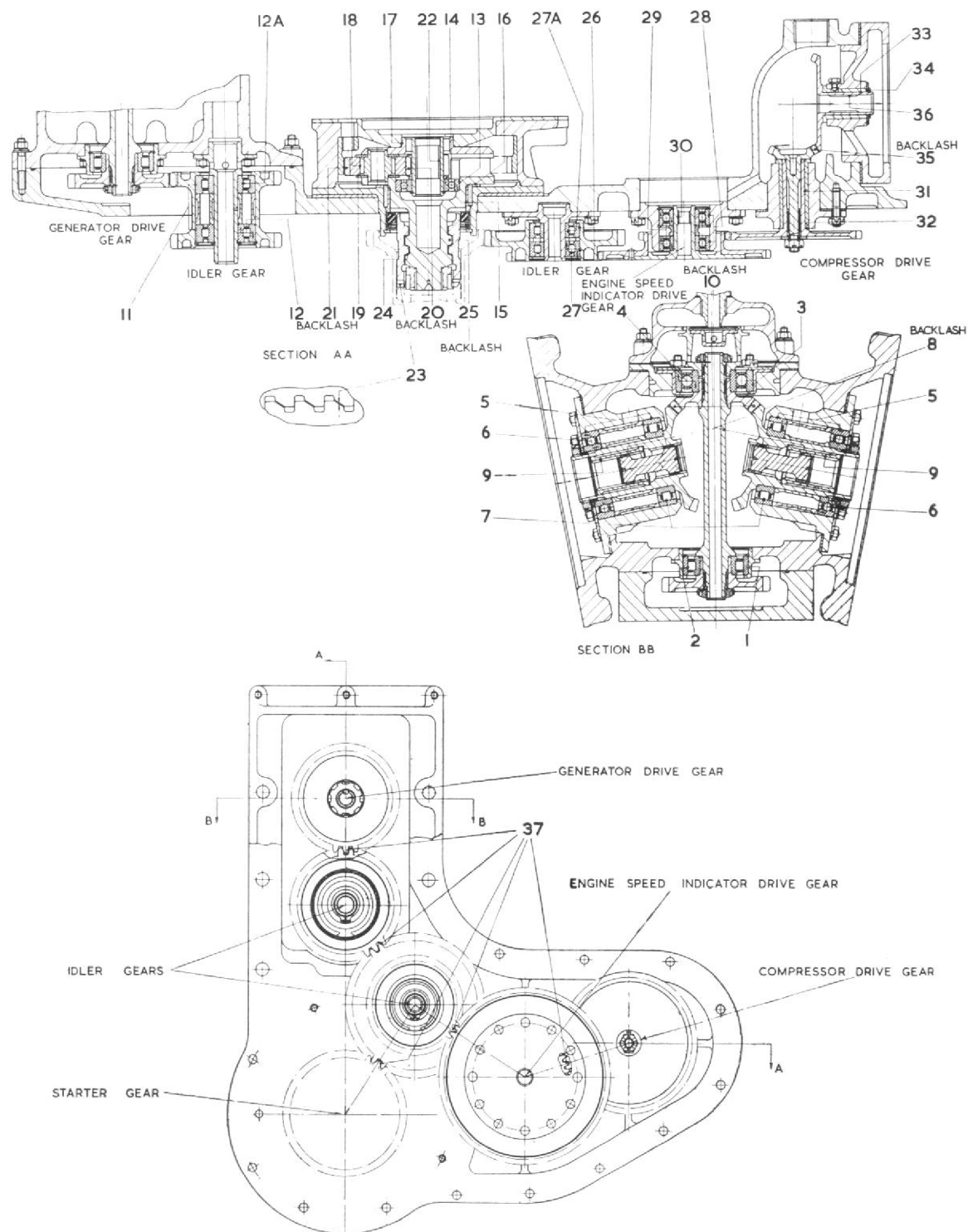


Fig. 13. Top wheelcase (Ghost 48 Mk. 2)

Revised by Amendment No. 114
September, 1954

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
3	Generator Drive Bevel Gear (Vertical) Ball Bearing in Housing					
	Housing—bore	$\frac{2.4407}{2.4413}$	—			
		$\frac{61,994 \text{ mm.}}{62,009 \text{ mm.}}$	—	$\frac{-0.0002}{+0.0009}$		
	Bearing—outside diameter	$\frac{2.4404}{2.4409}$	—	$\frac{-0.006 \text{ mm.}}{+0.022 \text{ mm.}}$	Not permitted	
		$\frac{61,987 \text{ mm.}}{62,000 \text{ mm.}}$	—			
4	Generator Drive Bevel Gear (Vertical) Ball Bearing					
	End float between inner and outer races	—	—	$\frac{0.0039}{0.0067}$	0.009	Hoffman type No. 325.
				$\frac{0.003}{0.005}$	0.007	Ransome and Marles type MJ.25.
5	Generator Drive Bevel Gears (Inclined) Ball and Roller Bearings in Housings					
	Housing—bore	$\frac{2.6868}{2.6874}$	2.6883	$\frac{-0.0002}{+0.0009}$	+0.0013	
	Bearings—outside diameter	$\frac{2.6865}{2.6870}$	2.6855			
6	Generator Drive Bevel Gears (Inclined) Ball Bearings					
	End float between inner and outer races	—	—	$\frac{0.0044}{0.0071}$	0.009	Hoffman type XLS.1½ or XLS.1½.V2.
				$\frac{0.003}{0.005}$	0.007	Ransome and Marles type XLJ.1½.
7	Generator Drive Bevel Gears (Inclined) Roller Bearings					
	Diametral clearance between rollers and outer race	—	—	$\frac{0.0015}{0.0020}$	0.0025	Hoffman type RXLS.1½.
				$\frac{0.0008}{0.0012}$	0.0015	Ransome and Marles type XLRJ.1½.

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
8	Generator Driving Shafts in Bevel Gears and Couplings Serration Backlash					
	Gear and coupling serrations—dimension between parallel faces	$\frac{0.5340}{0.5352}$	0.5414	$\frac{0.0026}{0.0064}$	0.010	
	Shaft serrations—dimension over parallel faces	$\frac{0.5288}{0.5314}$	0.5240			
9	Generator shaft in Coupling					
	Coupling serrations—dimension between parallel faces	$\frac{0.5340}{0.5352}$	0.5414	—	—	
10	Generator Drive Bevel Gears Backlash	—	—	$\frac{0.005}{0.011}$	0.015	Adjustable by the following adjusting shims:— (a) one shim situated beneath generator drive shaft top vertical housing flange $\frac{1}{16}$ in. nominal thickness in 0.003 increments. (b) one shim situated beneath both inclined bearing housing flanges $\frac{1}{16}$ in. nominal thickness in 0.002 or 0.003 increments.
11	Roller Bearings in Generator Idler Gear					
	Gear—bore	$\frac{1.8740}{1.8745}$	—	$\frac{-0.0007}{+0.0003}$	Not permitted	
	Roller bearings—outside diameter	$\frac{1.8742}{1.8747}$	—			
12	Generator Idler Gear Roller Bearing (Bottom)					
	End float between inner and outer races	—	—	$\frac{0.002}{0.004}$	0.006	Hoffman type L.4491
				$\frac{0.002}{0.006}$	0.009	Ransome and Marles type LLRJN. $\frac{3}{4}$.
12a	Generator Idler Gear Roller Bearing (Top)					
	Diametral clearance between rollers and inner race	—	—	$\frac{0.0010}{0.0015}$	0.002	Hoffman type L.4571
				$\frac{0.0005}{0.0009}$	0.0015	Ransome and Marles type LLRJ. $\frac{3}{4}$.

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
13	Starter Drive Ball Bearings in Planet Gears Carrier					
	Planet gears carrier—bore	$\frac{1.9993}{1.9998}$	2.0008	$\frac{-0.0002}{+0.0008}$	+0.0013	
	Ball bearing—outside diameter	$\frac{1.9990}{1.9995}$	1.9980			
14	Starter Drive Ball Bearing					
	End float between inner and outer races	—	—	$\frac{0.004}{0.007}$	0.010	Hoffman type S.10 with solid cage
				$\frac{0.004}{0.006}$	0.010	Ransome and Marles type KLNJ.1.
15	Planet Gears Carrier in Bottom Cover Bearing					
	Bearing—bore	$\frac{2.3750}{2.3755}$	2.3775	$\frac{0.0025}{0.0035}$	0.005	
	Planet gears carrier—spigot diameter	$\frac{2.3720}{2.3725}$	2.370			
16	Planet Gears Carrier and Cover					
	End float	—	—	$\frac{0.003}{0.021}$	0.030	Pre-mod. 845.
				$\frac{0.003}{0.023}$	0.030	Mod. 845 and 1036.
17	Planet Gears Carrier Cover in Top Cover					
	Top cover—bore	$\frac{1.6250}{1.6255}$	1.628	$\frac{0.004}{0.005}$	0.007	
	Planet gears carrier cover—spigot diameter	$\frac{1.6205}{1.6210}$	1.618			
18	Needle Rollers in Planet Gears					
	Diametral clearance	—	—	$\frac{0.0008}{0.0022}$	0.0035	
19	Planet Gears					
	End float	—	—	$\frac{0.002}{0.008}$	0.012	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
20	Sun Gear and Planet Gears Backlash	—	—	$\frac{0.003}{0.007}$	0.010	
21	Planet Gears and Annulus Gears Backlash	—	—	$\frac{0.004}{0.009}$	0.012	
22	Starter Shaft in Sun Gear Sun gear serrations— dimension between parallel faces	$\frac{0.4577}{0.4589}$	0.4641	—	—	
23	Starter Dog in Starter Drive Dog Axial clearance between dog teeth	—	—	$\frac{0.015}{0.025}$	—	This clearance is measured with starter drive dog bottoming on planet gears carrier nut and is adjusted by means of an adjusting shim situated between wheelcase top and starter gears casing. The nominal thickness of shim supplied is 0.114 in 0.003 laminations.
24	Starter Drive Dog on Planet Gears Carrier End float of starter drive dog when free	—	—	$\frac{0.002}{0.008}$	0.014	
25	Starter Drive Dog on Planet Gears Carrier Backlash (angular movement)	—	—	$\frac{0.0017}{0.0068}$ $\frac{0.0015}{0.0060}$	0.012 0.011	Part No. 92621. Part No. 91689.
26	Roller Bearings in Engine Speed Indicator Idler Gear Gear—bore Roller bearings—outside diameter	$\frac{1.5738}{1.5743}$ $\frac{39.974 \text{ mm.}}{39.987 \text{ mm.}}$ $\frac{1.5743}{1.5748}$ $\frac{39.987 \text{ mm.}}{40.000 \text{ mm.}}$	— — — —	— — $\frac{-0.001}{-0.000}$ $\frac{-0.026 \text{ mm.}}{-0.000 \text{ mm.}}$	Not permitted	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
27	Engine Speed Indicator Idler Gear Roller Bearing (Bottom)			$\frac{0.002}{0.004}$	0.006	Hoffman type R.117LL.
	End float between inner and outer races	—	—	$\frac{0.002}{0.006}$	0.009	Ransome and Marles type LLRJN.17.
27a	Engine Speed Indicator Idler Gear Roller Bearing (Top)			$\frac{0.0010}{0.0015}$	0.002	Hoffman type R.117E.
	Diametral clearance between rollers and inner race	—	—	$\frac{0.0005}{0.0009}$	0.0015	Ransome and Marles type LLRJ.17.
28	Ball Bearings in Engine Speed Indicator Drive Housing					
	Housing—bore	$\frac{1.5725}{1.5730}$	—			
		$\frac{39.942 \text{ mm.}}{39.954 \text{ mm.}}$	—	$\frac{-0.0023}{-0.0013}$		
	Ball bearings—outside diameter	$\frac{1.5743}{1.5748}$	—	$\frac{-0.058 \text{ mm.}}{-0.033 \text{ mm.}}$	Not permitted	Hoffman type bearing No. 117 or 117.V2
		$\frac{39.987 \text{ mm.}}{40.000 \text{ mm.}}$	—			
	Housing—bore	$\frac{1.5725}{1.5730}$	—			
		$\frac{39.942 \text{ mm.}}{39.954 \text{ mm.}}$	—	$\frac{-0.0023}{-0.0014}$		
	Ball bearings—outside diameter	$\frac{1.5744}{1.5748}$	—	$\frac{-0.058 \text{ mm.}}{-0.036 \text{ mm.}}$	Not permitted	Ransome and Marles type Bearing LJ.17.
		$\frac{39.990 \text{ mm.}}{40.000 \text{ mm.}}$	—			
29	Engine Speed Indicator Drive Ball Bearings					
	End float between inner and outer races	—	—	$\frac{0.0035}{0.0060}$	0.009	Hoffman type No. 117 or 117.V2
				$\frac{0.002}{0.004}$	0.006	Ransome and Marles type LJ.17.

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
30	Engine Speed Indicator Shaft in Gear Shaft Gear shaft serrations— dimension between parallel faces	$\frac{0.2208}{0.2217}$	0.2263	—	—	
31	Compressor Drive Gear (Spur) in Bush Bush—bore Gear shank—diameter	$\frac{0.6875}{0.6880}$ $\frac{0.6855}{0.6860}$	0.691 0.6825	$\frac{0.0015}{0.0025}$	0.005	
32	Compressor Drive Gear (Spur) End Float Gear—length of shank Bush—overall length	$\frac{2.151}{2.155}$ $\frac{2.147}{2.149}$	2.161 2.139	$\frac{*}{0.002}$ 0.008	0.012	* The minimum end float of 0.002 must be maintained after the correct backlash between the bevel gears has been established. See Ref. No. 35.
33	Compressor Drive Gear (Bevel) in Bush Bush—bore Gear shank—diameter	$\frac{0.6875}{0.6880}$ $\frac{0.6855}{0.6860}$	0.691 0.6825	$\frac{0.0015}{0.0025}$	0.005	
34	Compressor Drive Gear (Bevel) End float	—	—	$\frac{*}{0.002}$ 0.025	0.030	* The minimum end float of 0.002 must be maintained after the correct backlash between the bevel gears has been established. See Ref. No. 35.
35	Compressor Drive Bevel Gears Backlash	—	—	$\frac{0.005}{0.011}$	0.016	Adjustable by means of laminated shims nominal thickness $\frac{3}{32}$ in 0.003 increments, one situated beneath the flange of the compressor drive bearing housing, the other beneath the flange of the compressor adapter.

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
36	Compressor Driving Shaft in Compressor Drive Gear (Bevel)					
	Gear—width of spline-ways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
37	All Spur Gears Backlash	—	—	$\frac{0.0050}{0.0125}$	0.017	

Oil Sump (Ghost 48 Mk. 2) (Fig. 14)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Accessories Driving Gears Ball and Roller Bearings in Housing					
	Housing—bore	$\frac{2.4408}{2.4414}$	—			
		$\frac{61.996 \text{ mm.}}{62.012 \text{ mm.}}$	—	$\frac{-0.0001}{+0.0010}$		
	Bearings—outside diameter	$\frac{2.4404}{2.4409}$	—	$\frac{-0.004 \text{ mm.}}{+0.025 \text{ mm.}}$		Not permitted
		$\frac{61.987 \text{ mm.}}{62.000 \text{ mm.}}$	—			
2	Accessories Driving Gears Roller Bearing					
	Diametral clearance between rollers and outer race	—	—	$\frac{0.0013}{0.0018}$	0.0025	Hoffman type R.130 or R.130V3M or L.3008. At engine reconditioning, if the existing roller bearing is to be replaced by the original type R.130, it must be supplied with a yellow anti-friction metal cage.
				$\frac{0.0008}{0.0012}$	0.002	Ransome and Marles type LRJ.30.
3	Bevel Gears Backlash	—	—	$\frac{0.005}{0.011}$	0.016	Adjustable by means of an adjusting shim nominal thickness 0.060 in 0.003 increments situated beneath the flanges of the accessories driving gears housing and the fuel pump drive mounting plate bearing housing.



Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
4	Fuel Pump Drive Mounting Plate Ball Bearing in Housing					
	Housing—bore	$\frac{2.4402}{2.4408}$	—			
		$\frac{61,981 \text{ mm.}}{61,996 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0004}$		
	Ball bearing—outside diameter	$\frac{2.4404}{2.4409}$	—	$\frac{-0.019 \text{ mm.}}{+0.009 \text{ mm.}}$		Not permitted
		$\frac{61,987 \text{ mm.}}{62,000 \text{ mm.}}$	—			
5	Fuel Pump Drive Roller Bearing in Housing					
	Housing—bore	$\frac{1.9988}{1.9994}$	—	$\frac{-0.0007}{+0.0004}$		Not permitted
	Roller bearing—outside diameter	$\frac{1.9990}{1.9995}$	—			
6	Fuel Pump Drive Roller Bearing					
	Diametral clearance between rollers and outer races	—	—	$\frac{0.0010}{0.0015}$	0.002	Hoffman type RLS.9.
				$\frac{0.0008}{0.0012}$	0.002	Ransome and Marles type LRJ. $\frac{7}{8}$.
7	Quillshafts in Fuel Pump Driving Gear, Serration Backlash					
	Gear serrations—dimension between parallel faces	$\frac{0.3814}{0.3826}$	0.3878	$\frac{0.0006}{0.0044}$	0.007	
	Quillshafts serrations—dimension over parallel faces	$\frac{0.3782}{0.3808}$	0.3744			
8	Quillshaft in Hydraulic Pump Drive Quill Sleeve					
	Sleeve—width of spline-ways	$\frac{0.1250}{0.1265}$				
	Quillshaft—width of splines	$\frac{0.1220}{0.1235}$				
			Not applicable as the quillshaft is soldered to the sleeve and, therefore, there will be no backlash.			

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
9	Hydraulic Pump Shaft in Quill Sleeve					
	Sleeve—width of spline-ways	$\frac{0.1250}{0.1265}$	0.1305	—	—	
10	Quillshaft in Fuel Pump					
	Quillshaft serrations—dimension over parallel faces	$\frac{0.3782}{0.3808}$	0.3744	—	—	
11	Oil Pump Drive Ball Bearings in Housing					
	Housing—bore	$\frac{2.0465}{2.0471}$	—			
		$\frac{51.981 \text{ mm.}}{51.996 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0004}$		
	Ball bearings—outside diameter	$\frac{2.0467}{2.0472}$	—	$\frac{-0.019 \text{ mm.}}{+0.009 \text{ mm.}}$	Not permitted	Pre-mod. 748.
		$\frac{51.987 \text{ mm.}}{52.000 \text{ mm.}}$	—			
	Housing—bore	$\frac{2.0450}{2.0456}$	—			
		$\frac{51.943 \text{ mm.}}{51.958 \text{ mm.}}$	—	$\frac{-0.0022}{-0.0011}$	Not permitted	Mod. 748 prior to bearing housing Part No. 600930 being fitted.
	Ball bearings—outside diameter	$\frac{2.0467}{2.0472}$	—	$\frac{-0.057 \text{ mm.}}{-0.029 \text{ mm.}}$		
		$\frac{51.987 \text{ mm.}}{52.000 \text{ mm.}}$	—			
	Housing—bore	$\frac{2.0460}{2.0466}$	—			
		$\frac{51.968 \text{ mm.}}{51.984 \text{ mm.}}$	—	$\frac{-0.0012}{-0.0001}$	Not permitted	When bearing housing Part No. 600930 is fitted.
	Ball bearings—outside diameter	$\frac{2.0467}{2.0472}$	—	$\frac{-0.032 \text{ mm.}}{-0.003 \text{ mm.}}$		
		$\frac{51.987 \text{ mm.}}{52.000 \text{ mm.}}$	—			
12	Oil Pump Drive Ball Bearings					
	End float between inner and outer races	—	—	$\frac{0.005}{0.002}{0.004}$	$\frac{0.008}{0.006}$	Hoffman type L.25N or L.25N.V2. Ransome and Marles type KLNJ.25.

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
13	Quill in Oil Pump Drive Gear and Sleeve, Serration Backlash Gear and sleeve serrations—dimension between parallel faces Quill serrations—dimension over parallel faces	$\frac{0.2944}{0.2953}$ $\frac{0.2920}{0.2939}$	0.2999 0.2884	$\frac{0.0005}{0.0033}$	0.006	
14	Oil Pump Driving Gear in Sleeve, Serration Backlash Sleeve serrations—dimension between parallel faces Gear quill serrations—dimension over parallel faces	$\frac{0.2944}{0.2953}$ $\frac{0.2920}{0.2939}$	0.2999 0.2884	$\frac{0.0005}{0.0033}$	0.006	
15	Oil Pump Driving and Driven Gear Spindles in Oil Pump Body and Cover Oil pump body and cover—bore Gear spindles—diameter	$\frac{0.6250}{0.6255}$ $\frac{0.6232}{0.6237}$	0.6287 0.6200	$\frac{0.0013}{0.0023}$	0.005	
16	Oil Pump Driving and Driven Gears, End Float Oil pump body—depth of recess Gears—tooth width	$\frac{0.802}{0.805}$ $\frac{0.799}{0.800}$	0.808 0.794	$\frac{0.002}{0.006}$	0.008	The end float may be restored by carefully lapping the joint face of the oil pump body, but the recess depths must not be reduced below the minimum new dimension.
17	Oil Pump Driving and Driven Gears, Diametral Clearance Oil pump body—recess diameter Gears—diameter over teeth	$\frac{1.397}{1.398}$ $\frac{1.393}{1.394}$	1.401 1.390	$\frac{0.003}{0.005}$	0.007	
18	Oil Pump Gears Backlash	—	—	$\frac{0.006}{0.014}$	0.020	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
19	Oil Pump Drive Idler Gear Ball Bearings in Housing					
	Housing—bore	$\frac{1.6528}{1.6533}$ $\frac{41,981 \text{ mm.}}{41,994 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0003}$	Not permitted	Pre-mod. 748.
	Ball bearings—outside diameter	$\frac{1.6530}{1.6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	—	$\frac{-0.019 \text{ mm.}}{+0.007 \text{ mm.}}$		
	Housing—bore	$\frac{1.6513}{1.6518}$ $\frac{41,943 \text{ mm.}}{41,956 \text{ mm.}}$	—	$\frac{-0.0022}{-0.0012}$	Not permitted	Mod. 748, prior to bearing housing Part No. 600932 being fitted.
	Ball bearings—outside diameter	$\frac{1.6530}{1.6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	—	$\frac{-0.057 \text{ mm.}}{-0.031 \text{ mm.}}$		
	Housing—bore	$\frac{1.6523}{1.6528}$ $\frac{41,968 \text{ mm.}}{41,981 \text{ mm.}}$	—	$\frac{-0.0012}{-0.0002}$	Not permitted	When bearing housing Part No. 600932 is fitted.
	Ball bearings—outside diameter	$\frac{1.6530}{1.6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	—	$\frac{-0.032 \text{ mm.}}{-0.006 \text{ mm.}}$		
20	Oil Pump Drive Idler Gear Ball Bearings			$\frac{0.0031}{0.0054}$	0.008	Hoffman type L.20N or L.20N.V2
	End float between inner and outer races	—	—	$\frac{0.002}{0.004}$	0.006	Ransome and Marles type KLNJ.20.
21	Hydraulic Pump Drive Ball Bearings in Housing					
	Housing—bore	$\frac{1.6528}{1.6533}$ $\frac{41,981 \text{ mm.}}{41,994 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0003}$	Not permitted	Pre-mod. 748.
	Ball bearings—outside diameter	$\frac{1.6530}{1.6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	—	$\frac{-0.019 \text{ mm.}}{+0.007 \text{ mm.}}$		

Continued overleaf

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
21 (<i>contd.</i>)	Hydraulic Pump Drive Ball Bearings in Housing (<i>contd.</i>)					
	Housing—bore	$\frac{1-6513}{1-6518}$ $\frac{41,943 \text{ mm.}}{41,956 \text{ mm.}}$	—	$\frac{-0-0022}{-0-0012}$	Not permitted	Mod. 748 prior to bearing housing Part No. 600931 being fitted.
	Ball bearings—outside diameter	$\frac{1-6530}{1-6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	—	$\frac{-0,057 \text{ mm.}}{-0,031 \text{ mm.}}$		
	Housing—bore	$\frac{1-6523}{1-6528}$ $\frac{41,968 \text{ mm.}}{41,981 \text{ mm.}}$	—	$\frac{-0-0012}{-0-0002}$	Not permitted	When bearing housing Part No. 600931 is fitted.
	Ball bearings—outside diameter	$\frac{1-6530}{1-6535}$ $\frac{41,987 \text{ mm.}}{42,000 \text{ mm.}}$	—	$\frac{-0,032 \text{ mm.}}{-0,006 \text{ mm.}}$		
22	Hydraulic Pump Drive Ball Bearings			$\frac{0-0031}{0-0054}$	0-008	Hoffman type L.20N or L.20N.V2.
	End float between inner and outer races	—	—	$\frac{0-002}{0-004}$	0-006	Ransome and Marles type KLNJ.20.
23	Quillshaft in Hydraulic Pump and Oil Pump Drive Gear, Spline Backlash					
	Gear—width of spline-ways	$\frac{0-1250}{0-1265}$	0-1305	$\frac{0-0015}{0-0045}$	0-007	
	Quillshaft — width of splines	$\frac{0-1220}{0-1235}$	0-118			
24	Hydraulic Pump Shaft in Drive Gear					
	Gear—width of spline-ways	$\frac{0-1250}{0-1265}$	0-1305	—	—	
25	Circulating Pump Drive Roller Bearing in Housing					
	Housing—bore	$\frac{1-9988}{1-9994}$	—	$\frac{-0-0007}{+0-0004}$	Not permitted	
	Roller bearing—outside diameter	$\frac{1-9990}{1-9995}$	—			

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
26	Circulating Pump Drive Roller Bearing			$\frac{0.0010}{0.0015}$	0.002	Hoffman type RLS.9.
	Diametral clearance between rollers and outer race	—	—	$\frac{0.0008}{0.0012}$	0.002	Ransome and Marles type LRJ.4.
27	Circulating Pump Drive Mounting Plate Ball Bearing in Housing					
	Housing—bore	$\frac{2.4402}{2.4408}$	—			
		$\frac{61,981 \text{ mm.}}{61,996 \text{ mm.}}$	—	$\frac{-0.0007}{+0.0004}$		
	Ball bearing—outside diameter	$\frac{2.4404}{2.4409}$	—	$\frac{-0.019 \text{ mm.}}{+0.009 \text{ mm.}}$	Not permitted	
		$\frac{61,987 \text{ mm.}}{62,000 \text{ mm.}}$	—			
28	Circulating Pump Drive Mounting Plate Ball Bearing					
	End float between inner and outer races	—	—	$\frac{0.0035}{0.0061}$	0.008	Hoffman type M.25N or M.25N.V2
				$\frac{0.003}{0.005}$	0.007	Ransome and Marles type KMNJ.25.
29	Quillshaft in Circulating Pump Driving Gear Serration Backlash					
	Gear serrations—dimension between parallel faces	$\frac{0.3814}{0.3826}$	0.3878	$\frac{0.0006}{0.0044}$	0.007	
	Quillshaft serrations—dimension over parallel faces	$\frac{0.3782}{0.3808}$	0.3744			
29a	Circulating Pump Shaft in Driving Gear					
	Gear serrations—dimension between parallel faces	$\frac{0.3814}{0.3826}$	0.3878	—	—	
30	Oil Relief Valve Spring	—	—	—	—	To be inspected visually for defects. Subject to function test.
31	Oil Relief Valve Plunger in Housing					
	Housing—bore	$\frac{0.8000}{0.8010}$	0.8035	$\frac{0.0035}{0.0050}$	0.007	
	Plunger—outside diameter	$\frac{0.7960}{0.7965}$	0.793			

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
32	All Spur Gears except Accessory Drives Idler Gear Backlash	—	—	$\frac{0.0050}{0.0125}$	0.017	

Impeller Vane and Front Bearing (Ghost 48 Mk. 2) (Fig. 15)

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
1	Impeller Clearance Clearance between impeller vane and diffuser casing, measured at the four lead-tipped plug positions on the diffuser casing		Pre-mod. 916 see Fig. 15 Mod. 916 see Fig. 16	$\left\{ \begin{array}{l} 0.060 \\ 0.070 \end{array} \right.$ $\left\{ \begin{array}{l} 0.070 \\ 0.080 \end{array} \right.$	$\frac{0.0595}{0.0700}$ $\frac{0.0695}{0.0800}$	Any distortion around the impeller profile at this diametral position must not exceed 0.010.
1a	Impeller Clearance Clearance between impeller vane and diffuser casing, measured at impeller throat as indicated on diagram	—	—	$\frac{0.0585}{0.0640}$	—	
2	Impeller and Sealing Plate Labyrinth Clearance between impeller and sealing plate labyrinths	—	—	$\frac{0.0060}{0.0185}$	$\frac{0.006}{0.019}$	This clearance must be measured with the thrust bearing end float fully taken up in the forward position and when mod. 850 and 1143 have been incorporated, is adjustable by means of shims Part No. 601915 and 605199.
3	Impeller and Diffuser Casing Rear Cover Impeller blade in relation to rear cover face	—	—	—	—	This check is obsolete and should be ignored.

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
4	Impeller Eccentricity Total indicator clock readings at the following Stations:— N 0.0015 H 0.005 I (1 in. from back face)* 0.006					Measured at final balance of (a) impeller assembly and (b) rotative assembly comprising impeller, main shaft, extension shaft, turbine disc and blade assemblies.
5	Impeller "Swash" Total indicator clock readings at the following Stations:— A 0.0015 B (1 in. from outer edge)* 0.008 C (1 in. from outer sealing groove)* 0.006 D 0.004 E 0.003					Measured at final balance of (a) impeller assembly (Stations A, B, C, D and E) and (b) rotative assembly comprising impeller, main shaft, extension shaft and turbine disc and blade assemblies (Stations A, B, C, D, E, F and G).
6	Main Shaft Eccentricity, Impeller End Total indicator clock readings at the following Stations:— F 0.005 G 0.005					The location of Station F to be approximately as indicated on diagram.
7	Diffuser Casing Rear Cover Eccentricity of bore, total indicator clock readings	0.008	0.020	—	—	Provided that a check is made by means of either checking fixture T.75908 or alignment mandrel T.72482.
8	Diffuser Casing Rear Cover Lack of squareness of sealing plate flange abutment face with bore, total indicator clock readings	0.006	0.008	—	—	

* All location dimensions are approximate.

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		in.	in.	in.	in.	
8a	Diffuser Casing Rear Cover Maximum depth of fretting on combustion chamber joint face.	—	0.005	—	—	
9	Ball Bearing	Hoffman type No. 3967 or 3967F Ransome and Marles type 4LJ2½ Skefko type S.K.F. No. 403524 or 403524B		0.012 0.017 0.018 Max. 0.015 0.020	0.018 Not permitted Not permitted	Measured with 25 lb. end load. Where the engine has completed 100 hours running before reconditioning, a new front bearing must be fitted. Where the engine has been dismantled before it has completed 100 hours running, the maximum permissible end float and general condition of the bearing in conjunction with a consideration of the hours which the bearing has run and is expected to run after assembly, must decide whether the original bearing should be refitted or not.

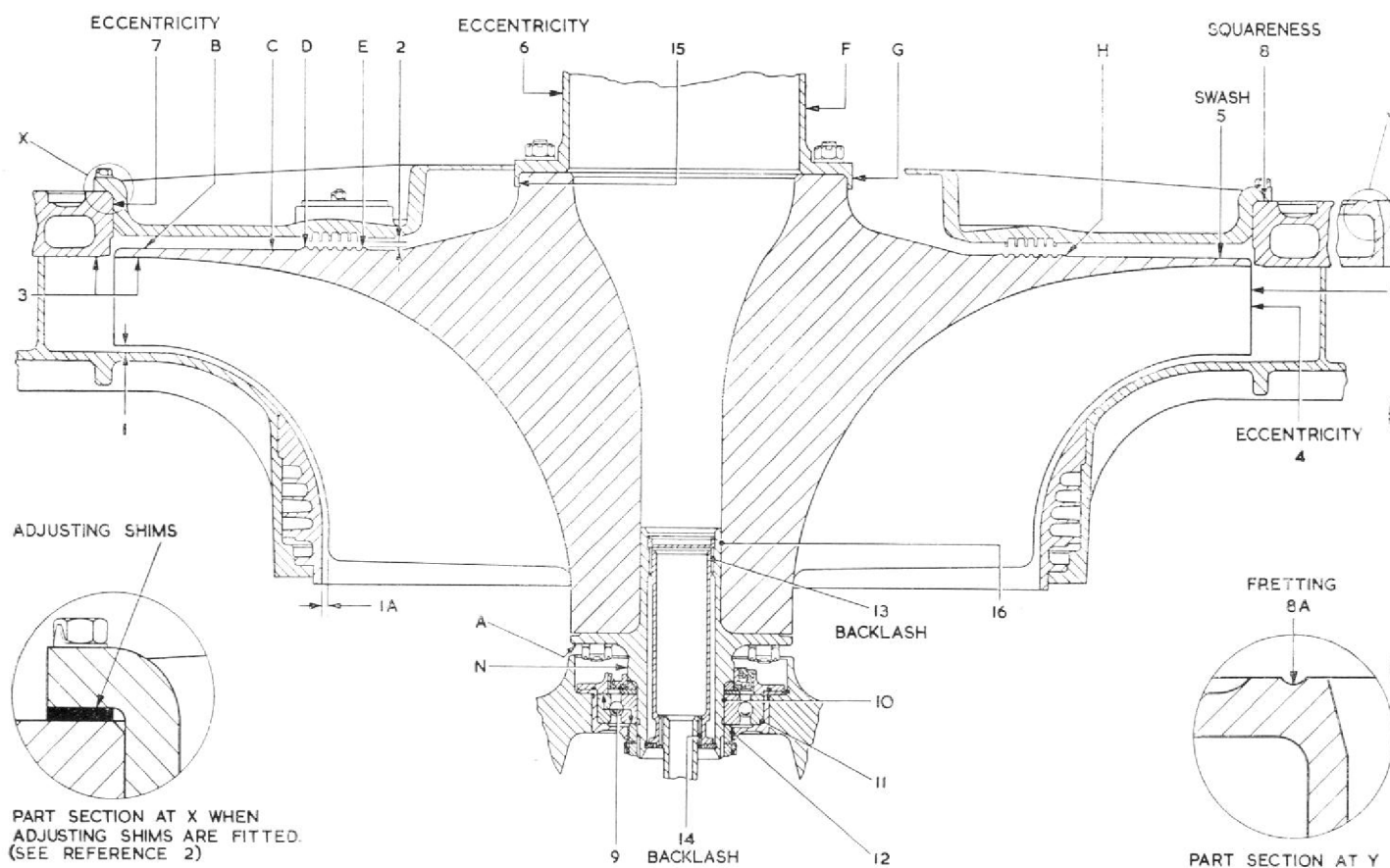


Fig. 15. Impeller vane and front bearing (Ghost 48 Mk. 2)

Revised by Amendment No. 137
April, 1958

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
10	Impeller Pivot in Ball Bearing	$\frac{2.7497}{2.7502}$	—	$\frac{-0.0005}{+0.0005}$	—	Hoffman type No. 3967 and Skefko type SKF Nos. 403524 and 403524B ball bearing.
	Ball bearing—bore	$\frac{2.7497}{2.7502}$	—	$\frac{-0.0005}{+0.0003}$	—	
	Pivot—diameter	$\frac{2.7497}{2.7500}$	—	—	—	
	Ball bearing—bore	$\frac{2.7497}{2.7502}$	—	—	—	Ransome and Marles type 4LJ 2½ ball bearing
	Pivot—diameter	—	—	—	—	
		—	—	—	—	
11	Ball Bearing in Front Bearing Housing	$\frac{5.2487}{5.2492}$	—	$\frac{0.000}{0.001}$	—	Hoffman type No. 3967 and Skefko type SKF Nos. 403524 and 403524B ball bearing.
	Bearing housing—bore	$\frac{5.2482}{5.2487}$	—	$\frac{0.0002}{0.0010}$	—	
	Ball bearing—outside diameter	$\frac{5.2487}{5.2492}$	—	—	—	
	Bearing housing—bore	$\frac{5.2482}{5.2485}$	—	—	—	Ransome and Marles type 4LJ 2½ ball bearing.
	Ball bearing—outside diameter	—	—	—	—	
		—	—	—	—	
12	Bearing Spacer in Bearing Housing	$\frac{3.2520}{3.2525}$	—	$\frac{0.0075}{0.0095}$	Not applicable	
	Bearing housing—bore	$\frac{3.2430}{3.2445}$	—	—	—	
	Spacer—outside diameter	—	—	—	—	
13	Accessory Drive Shaft in Impeller Pivot, Serration Backlash	$\frac{1.3320}{1.3338}$	1.3411	$\frac{0.0009}{0.0066}$	0.010	
	Pivot serrations—dimension between parallel faces	$\frac{1.3272}{1.3311}$	1.3220	—	—	
	Shaft serrations—dimension over parallel faces	—	—	—	—	
14	Centre Housing Drive Shaft in Accessory Drive Shaft, Serration Backlash	$\frac{0.7820}{0.7835}$	0.7892	$\frac{0.0008}{0.0055}$	0.008	
	Accessory drive shaft serrations—dimension between parallel faces	$\frac{0.7780}{0.7812}$	0.7740	—	—	
	Centre housing drive shaft serrations—dimension over parallel faces	—	—	—	—	

Ref. No.	Component and Description	New Dimensions	Permissible Worn Dimensions	New Clearances	Permissible Worn Clearances	Remarks
		<i>in.</i>	<i>in.</i>	<i>in.</i>	<i>in.</i>	
15	Main Shaft Spigot Bore					
	Spigot bore—diameter (Standard size)	$\frac{10.375}{10.376}$	10.391*	—	—	* This diameter to be measured at outer end of bore.
	Spigot bore—diameter (0.010 inch undersize)	$\frac{10.365}{10.366}$	10.381*	—	—	
	Spigot bore—diameter (0.020 inch undersize)	$\frac{10.355}{10.356}$	10.371*	—	—	
	Spigot bore—diameter (0.030 inch undersize)	$\frac{10.345}{10.346}$	10.361*	—	—	
	Spigot bore—ovality	—	0.005	—	—	The maximum diameter of spigot bore to be not greater than the relevant Permissible Worn Di- mension.
	Spigot bore—taper	—	0.005	—	—	
16	Impeller Pivot in Impeller					
	Standard pivot bore:—					
	Impeller hub—pivot bore	$\frac{2.5250}{2.5255}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5278}{2.5283}$	—			
	0.010 oversize pivot bore:—					
	Impeller hub—pivot bore	$\frac{2.5350}{2.5355}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5378}{2.5383}$	—			
	0.020 oversize pivot bore:—					
	Impeller hub—pivot bore	$\frac{2.5450}{2.5455}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5478}{2.5483}$	—			
	0.030 oversize pivot bore:—					
	Impeller hub—pivot bore	$\frac{2.5550}{2.5555}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5578}{2.5583}$	—			
	0.040 oversize pivot bore:—					
	Impeller hub—pivot bore	$\frac{2.5650}{2.5655}$	—	$\frac{-0.0033}{-0.0023}$	—	
	Impeller pivot—outside diameter	$\frac{2.5678}{2.5683}$	—			

See TR.222 in chapter 28.

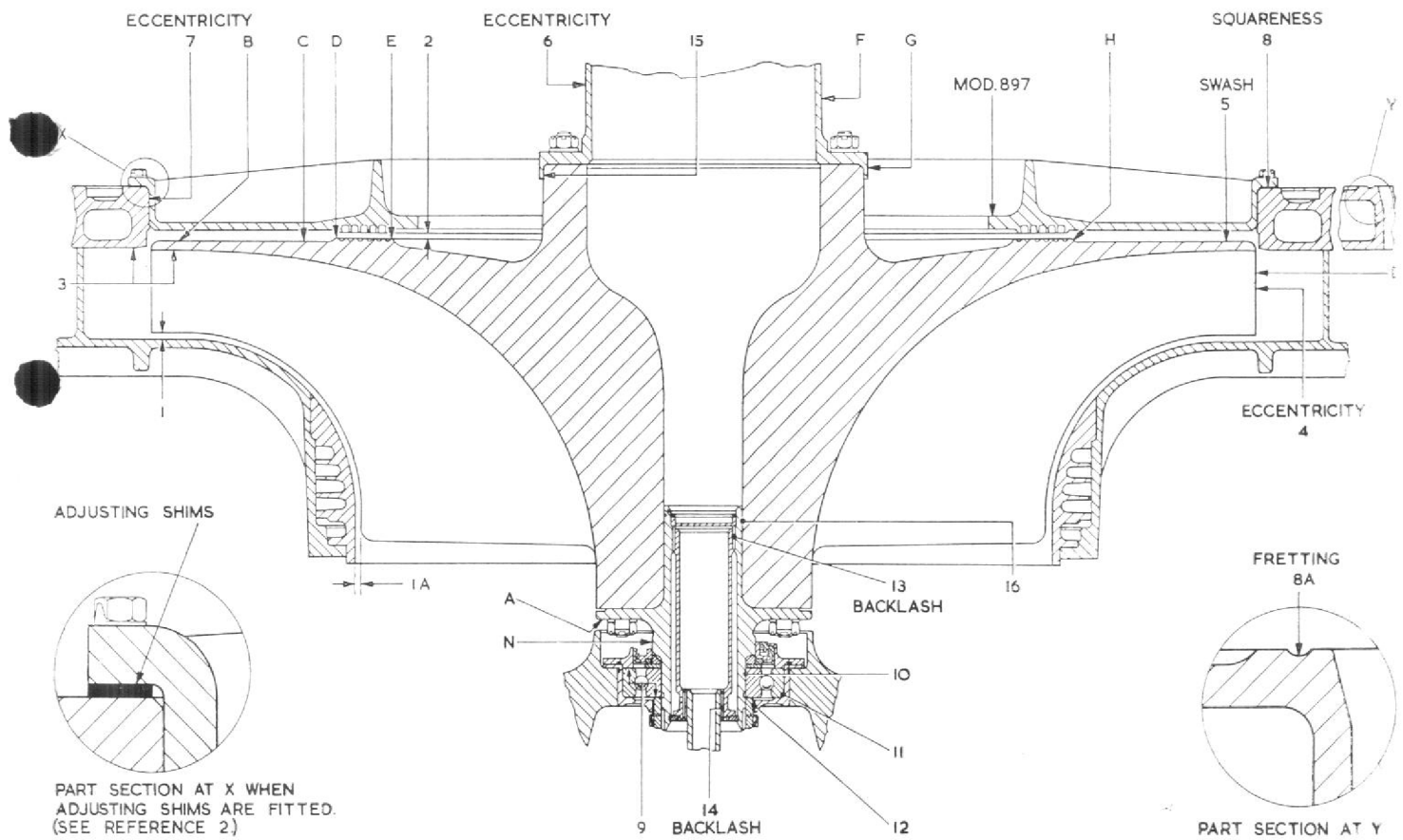


Fig. 16. Impeller vane and front bearing (Ghost 48 Mk. 2).



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