



# LINDSTRAND BALLOONS

## MAINTENANCE MANUAL

For use with all Lindstrand Hot Air Balloons

CAMERON BALLOONS LTD

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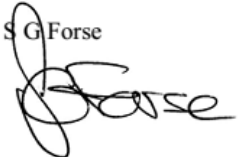
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Record of Amendments

No.	Date	Affected Pages	Approval
1	12.04.96	ii, iii, 16, 16a, 25, 62a, 62b	S G Forse
2	22.09.97	ii, iii, iv, S1-1, S1-2, S1-3, S1-4, S1-5	M Goodwin
3	05.02.98	ii, iii, iv, 28, 38, 65, S2-1, S2-2, S2-3, S2-4, S2-5, S2-6, S2-7, S2-8, S2-9	M Goodwin
4	10.06.99	ii, iii, iv, S3-1, S3-2, S3-3, S3-4, S3-5, S3-6, S3-7, S3-8, S3-9, S3-10, S3-11	M Goodwin
5	29.06.01	ii, iii, iv, S4-1, S4-2	S G Forse
6	27.09.01	ii, 63, 63a, 64, 65, 66, 67	S G Forse
7	29.10.01	ii, iii, 66, 67	S G Forse
8	10.07.06	ii, 67	S G Forse
9	22.05.07	ii, iii, iv, 20, 21, 21a, 22, 24, 25, 28, 33, 46, 46a, 63, 64, 65, 66, 67, S5-1, S5-2, S5-3, S5-4	
10	19.10.17	i, ii, iia, 2, 20, 47, 64. Pages 21-25 and 65-67 deleted.	The technical content of this document is approved under the authority of DOA nr EASA.12J.140 (C720)

Amendments

This manual is kept up to date by amendments consisting of loose-leaf pages, required to add new information or amend existing information. Pages affected by an amendment and the effective date are shown above. The pages themselves are identified by a change of the issue number at the bottom of each page. The number after the point in the issue number represents the amendment level of that page, e.g. the page marked Issue 1.4 is at Issue 1, modified by Amendment 4.



List of effective pages.

Section	Page	Issue	Section	Page	Issue	Section	Page	Issue
0	i	1.10	4	20	1.10	5 (cont)	46a	1.9
	ii	1.10		21	Deleted		47	1.10
	ii a	1.10		21a	Deleted		48	1.0
	iii	1.7		22	Deleted		49	1.0
	iii a	1.9		23	Deleted		50	1.0
	iv	1.9		24	Deleted		51	1.0
				25	Deleted		52	1.0
1	1	1.0					53	1.0
			5	26	1.0		54	1.0
2	2	1.10		27	1.0		55	1.0
				28	1.9		56	1.0
3	3	1.0		29	1.0		57	1.0
	4	1.0		30	1.0		58	1.0
	5	1.0		31	1.0		59	1.0
	6	1.0		32	1.0		60	1.0
	7	1.0		33	1.9		61	1.0
	8	1.0		34	1.0		62	1.0
	9	1.0		35	1.0		62a	1.1
	10	1.0		36	1.0		62b	1.0
	11	1.0		37	1.3			
	12	1.0		38	1.0	6	63	1.9
	13	1.0		39	1.0		63a	1.9
	14	1.0		40	1.0		64	1.10
	15	1.0		41	1.0		65	Deleted
	16	1.1		42	1.0		66	Deleted
	16a	1.1		43	1.0		67	Deleted
	17	1.0		44	1.0			
	18	1.0		45	1.0			
	19	1.0		46	1.10			

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## SECTION 2

### AIRWORTHINESS LIMITATIONS

#### 2.1 Approval Statement

This manual provides the maintenance instructions and inspection schedule for all types and variants detailed in EASA.BA.501 EASA.BA.502 EASA.BA.503, EASA.BA.504, EASA.BA.505, EASA.BA.506, EASA.BA.120, and EASA.BA.121 as required by EASA Certification Specification CS31 HB, Amendment 1, paragraph CS31 HB.82. The technical content of this document is approved under the authority of DOA nr EASA.21 J.140.

#### 2.2 Mandatory Replacement Time

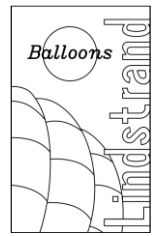
See Section 6.2.2 Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.

#### 2.3 Structural Inspection Interval

See Section 6.2.1 Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.

#### 2.4 Structural Inspection Procedure

See Section 6 Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.



#### SECTION 4

##### PILOT OWNER MAINTENANCE

See Section 1.5 Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.



### 5.3.6 Bleed Valve

The bleed valve controls the maximum amount of fuel that the cylinder can carry. If it leaks, it must be replaced in total, for which the cylinder must be emptied. The dip tube length for V20, V30 and V40 cylinders is 176 mm (6 7/8"). The length for H40 and H55 cylinders is 72 mm. When replacing the bleed valve use either PTFE tape or Loctite 577 pipe sealant on the thread.

### 5.3.7 Contents Gauge

Each different type of cylinder is fitted with a different gauge and care must be taken to ensure that the correct type is fitted. The indicating dial on top of the cylinder can be replaced by unscrewing the two retaining screws and fitting a replacement. Any other work on the gauge requires the cylinder to be completely vented. If problems are encountered, it is best to check whether the float is moving by inverting the cylinder and listening for the movement of the float. If the float is moving and there is no indication, replace the dial and re-test. If there is still no movement of the pointer, the gauge must be removed and replaced with a new one. There are no serviceable items on the gauge itself.

### 5.3.8 Cylinder Bodies

If the cylinder pressure vessel body is damaged in any way, it must be submitted to the factory or a qualified inspector for assessment. Damage to the top and bottom protective rings is not important provided that there is no damage to the join between the cylinder body and the rings. Under no circumstances must welding be performed on the cylinders to repair damage, unless undertaken by the factory.

#### 5.3.8.1 Cylinder Body Damage Limits

See Section 6.6.7.5 of Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision



When reassembling the replacement hose, new sealing washers must be used with the 3/8" BSP male threads. The 1/4" NPT thread should be sealed using Loctite 577, which is applied to the male thread only.

Once the hose has been fitted, the joints must be pressure tested at 7 bar (100 psi) for integrity.

#### 5.4.2 Servicing Valve Assemblies

These instructions apply to all the toggle type valve assemblies which control the flow to either the main vaporising coil or to the commercial liquid fire (CLF), or the normal liquid fire unit. The only difference between the two types of valve assembly is the length of the valve stem.

##### 5.4.2.1 Dismantling the Valve Assembly

All the numbers in brackets refer to the ballooned item numbers on Figure 5.4.2.

Use a large wide jawed adjustable spanner (wrench) to unscrew the complete valve assembly from the burner. It is recommended that the faces of the spanner are covered with masking tape to prevent scratches on the valve assembly. Move the valve handle (1) into a vertical position so that the valve is in an open position. On the underside of the valve handle (1) are two grub screws (2). Loosen these two grub screws but do not remove them. Close the valve handle again and gently push the pivot pin (3) out to one side of the handle. This will release the handle from the valve stem (4). The pivot pin does not need to be completely removed from the handle. Once the handle has been released, retighten one of the grub screws onto the pivot pin to retain the pivot pin in the correct alignment.

Remove the plastic wear pad (5) from on top of the valve assembly and store safely. It should be noted that these wear pads (5) are not always interchangeable between valve assemblies. It is recommended that only one valve assembly is dismantled at any time.

##### 5.4.2.2 Replacing Valve Seals

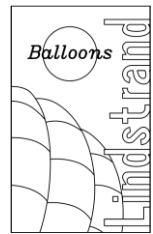
Carefully withdraw the valve stem (4) and seals from the valve bonnet (6). Gently push the lip seal (7), washer (8), spring (9), and seat carrier sleeve (10), up the valve stem (4). This permits the removal of the seat carrier (11) from the valve stem (4). Inspect the sealing surface of the valve seat for any damage or foreign bodies.

Normally, there is a circular indentation where the seat rests on the main valve block. Inspect this area in particular, for any cuts or damage. If the sealing surface is damaged, the complete seat carrier (11) must be replaced.

Remove the lip seal (7), washer (8) and spring (9) from the valve stem (4), taking care not to scratch the valve stem. The quad ring seal (12) is removed by carefully sliding a piece of wire down the side of the seal and hooking it under the seal. Lift the seal out of the recess on the stem and slide it off the stem. Note that if this seal (12) is removed, it must not be replaced. A new seal must always be fitted on re-assembly.

Inspect the valve stem (4) for any signs of scratches or damage. Scratches are best detected by running a finger nail over any marks. If the scratch can be felt, then the stem must be replaced. Frequently there are slight wear marks along the shaft where the lip seal (7) contacts the shaft. These wear marks do not necessarily mean that the shaft or lip seal require replacement.

If a valve stem leak is experienced, then the valve stem (4), lip seal (7) and quad ring seal (12) must be replaced. Re-assembly is generally the reversal of the dismantling process. Ensure that the lip seal (7) and the quad ring seal (12) are lubricated with grease prior to installation. There is no particular orientation for the quad ring seal, but the lip seal must be mounted upon the valve stem so that the helical spring, visible inside the seal, is facing towards the seat carrier end of the valve stem. Re-fit the grub screws (2) retaining the valve handle pivot pin (3) using a small amount of Loctite 243 on the pointed end of the screw. Note that the machined flat on the pivot pin must face the grub screws.



#### 6.2 100 Hour/Annual Inspection

See Section 6 of Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.

#### 6.3 Fabric Strength Test

See Section 6 of Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.

#### 6.4 Inspection After Overheating

See Section 6 of Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.

#### 6.5 Hydrostatic Structural Inspection

See Section 6 of Cameron Balloons Limited Hot Air Balloon Maintenance Manual Issue 10 Amendment 4 or later approved revision.