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7.6 LINDSTRAND 'BOTTOM ENDS'

7.6.1 GENERAL INFORMATION

This supplement shall be inserted in the Maintenance Manual, in Section 7: 'Supplements' with the revisions record sheet amended accordingly.

Information contained herein supplements, or in the case of conflict, supersedes that contained in the basic Maintenance Manual. For Limitations, Procedures, and Performance Data not contained in this supplement, consult the basic Hot Air Balloon Maintenance Manual.

Issue 1 of this supplement consists of 16 pages.

NOTE: Throughout this document "Lindstrand" refers to Lindstrand Hot air Balloons Limited

7.6.1.6 Identification of systems

All major components of Lindstrand hot air balloons are identified by a serial number and a description. These are located as follows:

Burner - Engraved onto the top of the cross-over valve.
Basket - Engraved onto a plate screwed onto the basket sidewall.
Cylinder - Engraved on a plate which is fixed to the bottom foot ring of the cylinder

7.6.2 ENVELOPE REPAIRS

See Supplement 7.46.

7.6.3 BASKET REPAIRS

No Change.

7.6.4 FUEL SYSTEM REPAIRS

7.6.4.4 FUEL CYLINDERS

7.6.4.4.4 Vapour Regulators

The outlet of the vapour valve is fitted with a left-hand POL thread. The regulator is screwed into this outlet.

Regulators are set to 8 psi at the factory. The pressure setting can be altered in the following manner:

a. BMV Type Regulator: Remove the blue plastic blanking plug on the regulator. Insert the suitable size of hexagonal wrench (allen key). Turning the wrench clockwise increases the pressure, and anti-clockwise reduces the pressure.

b. Calor Type Regulator: Unscrew the locking nut situated on the threaded thumb screw. Turn the thumb screw clockwise to increase the pressure. Re-tighten the locking nut when the correct delivery pressure is reached.

For normal flight conditions, the regulator delivery pressure should not need adjustment. If poor delivery is causing a weak pilot light flame, it is more likely that the regulator has malfunctioned and should be replaced in total.

7.6.4.5 BURNER REPAIRS

When any work is performed on the burners, it is very important to ensure that a high standard of cleanliness is achieved. Components should be cleaned using paraffin (kerosene) and dried with soft lint-free cloth, or left to dry naturally.

Once any type of service work has been performed on the burner, a pressure test at 7 bar (100 psi) must be conducted to ensure there are no fuel leaks within the burner. The preferred method of pressure testing is to use compressed air fed into the burner hose via an adaptor. Each joint in the pressurised system is then tested for leaks using leak detector spray applied over the connection. Each burner function is tested to ensure correct operation. Once the burner has no leaks, it may be test fired using fuel. Again, each function of the burner is tested and observed for correct operation.

KSP 125 grease is the preferred grease wherever grease is specified, but Molybdenum Disulphide grease is an acceptable alternative.

7.6.4.5.1 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.

7.6.4.5.1.1 Dismantling the Valve Assembly

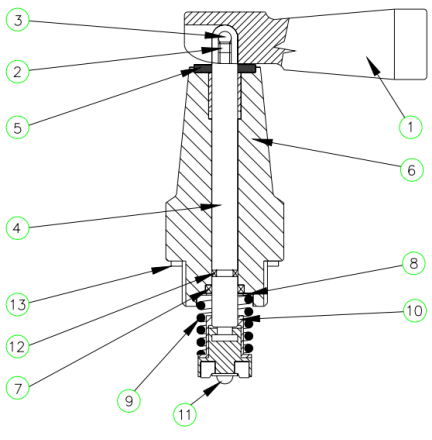


FIG 5.4.2
VALVE ASSEMBLY COMPONENTS

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.

7.6.4.5.1.2 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.

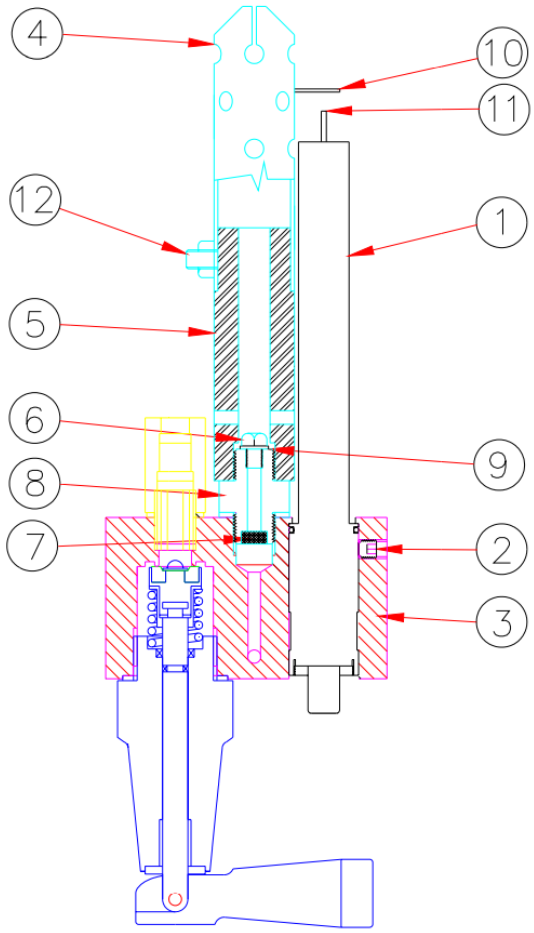
If a valve stem leak is experienced, then the valve stem (4), lip seal (7) and quad ring seal (12) must be replaced.

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.

When replacing the valve assembly back into the block, smear a small amount of grease on to the valve assembly threads and ensure that the copper sealing washer (13) is present.

7.6.4.5.2 Servicing the Pilot Light

FIG 5.4.3 PILOT LIGHT ASSEMBLY



The pilot light is supplied with vapour from the pilot light regulator. It is situated within the burner can. If a pilot light failure is experienced, it is usually due to detritus blocking the pilot light jet. To prevent this happening, a small filter is inserted into the feed to the jet.

The numbers in brackets refer to the ballooned item numbers on Figure 5.4.3.
The pilot light is removed by first withdrawing the igniter assembly (1) down into the burner block. Unscrew the igniter retaining grub screw (2) which is located in the side face of the main burner block (3). Push the complete igniter assembly (1) out through the bottom of the burner block (3). Insert a screwdriver which has a thin shaft, through two opposite holes in the pilot light cup (4). A special tool is available from the factory to achieve this task. Unscrew the complete pilot light cup assembly (4, 5) to reveal the pilot light jet (6). Unscrew the pilot light jet (6) using a ¼" AF socket.

If the pilot jet is held up to a bright light, the hole should appear round. If not, clean the jet in kerosene and use an airline to clear the jet of any blockage. If this procedure does not dislodge the blockage, then insert a fine piece of wire from the top of the jet into the hole and push any obstruction out. Jet cleaners which are used for tilley lamps or camping stoves are suitable.

The pilot light filter (7) is accessible by unscrewing the jet adaptor (8) from the burner block, using a ¾" (19 mm) socket. The filter is situated in the upstream end of the adaptor and is a sintered bronze filter. It is possible to clean this filter by soaking the complete adaptor in kerosene and then blowing back through the filter with an airline. However, if the filter is heavily blocked, it is recommended that this filter is replaced.

Re-assembly of the pilot light system is the reverse of the dismantling process.

Ensure that there is a copper washer (9) under the pilot light jet (6) when it is screwed into the jet adaptor. Once the complete pilot light assembly has been fitted, replace the igniter unit (1). The pilot light cup (4) may need repositioning so that the earthing tag (10) for the igniter is positioned directly above the igniter electrode (11). This is achieved by loosening the grub screw (2) on the side of the pilot light cup and rotating the cup until the earthing tag is in the correct position. The gap between the electrode and the earthing tag should be 3/16" (4 mm).

7.6.4.5.3 Servicing the Pilot Valve and Regulator Unit

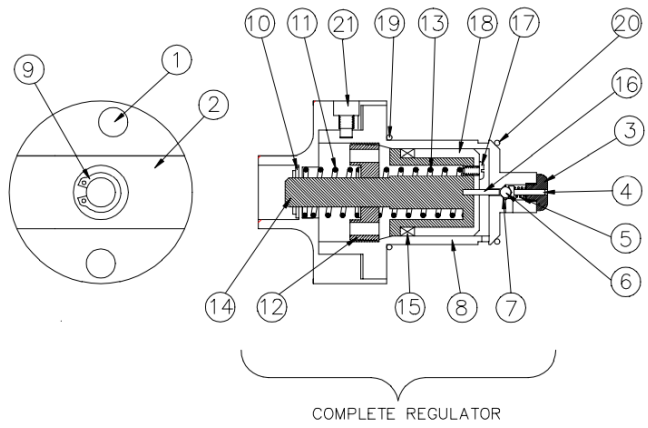


FIG 5.4.4. PILOT REGULATOR ASSEMBLY

All numbers in brackets refer to the ballooned item numbers on Figure 5.4.4.

7.6.4.5.3.1 Removing the Pilot Light Regulator from the Burner

There are two holes (1) in the handle (2) facing into the machined block. At the bottom of these holes there are two socket head screws visible. Undo and remove these screws using a 3 mm allen key (hexagon wrench). Rotate the pilot light handle (2) through 90° and two more screws will be visible. Undo and remove these screws as well. Grasp the pilot light handle and gently remove the complete regulator assembly from the burner block. Care should be taken because there is a fuel filter situated at the end of the regulator. This is not retained in position and may be lost when the regulator assembly is removed. Transfer the complete regulator assembly into a clean environment.

7.6.4.5.3.2 Servicing the Pilot Light Valve

If difficulties are experienced with the pilot light valve not functioning properly, then proceed as follows:

Ensure valve handle is in the ON position. Unscrew the spring retaining screw (3) using a large screw driver or 3/8" AF spanner. Take care when removing this screw because there are some small spring-loaded components retained by it. Remove the spring guide (4), spring (5) and the sealing ball (6) from the housing. If the regulator is inverted, the piston pin will also fall out. This item is very small and easily lost, so take care. Insert the spring (5) back over the spring guide (4) and try to compress the spring to ensure that it is not binding. Carefully inspect the sealing ball (6) for signs of any scratches or embedded material. If any material is present, carefully remove it. The sealing ball should be washed with water and natural soap if necessary, and allowed to dry naturally.

The valve seat (7), upon which the sealing ball seals, should be inspected for any evidence of scratches or marks. Inspection is simplified by shining a torch into the bore. If any scratches are present, the complete regulator body (8) must be replaced.

Re-assembly is achieved by inserting the piston pin, dropping the sealing ball into the housing and placing the spring guide (4) and spring (5) on top of it. Insert the end of the spring guide (4) into the hole in the spring retaining screw (3) and screw home until tight. This thread should not be locked with any type of thread locking compound.

The basic function of the valve can then be tested by turning the valve handle off and on. By watching the end of the spring guide (4) where it protrudes out of the spring retaining screw (3), the valve operation is functioning correctly if the spring guide moves up and down.

Before replacing the regulator assembly into the burner block, the fuel filter should be cleaned. If the fuel filter has remained in the block when the regulator assembly was removed, it can be simply removed by sticking a little finger into the centre of the filter and withdrawing it from the block. It should be cleaned in Trichloroethane (MEK) or kerosene and dried off before replacing it into the block.

7.6.4.5.3.3 Replacing the Pilot Regulator

Lightly grease the two "O" ring seals on the outside of the regulator body. Carefully insert the regulator assembly into the burner block. Rotate the assembly so that all four holes in the regulator body line up with the holes in the burner block. The hole pattern is asymmetric, so there is only one correct orientation. Carefully insert the four retaining screws and tighten up. Only use the allen key to tighten these screws, as this will prevent over-tightening.

7.6.4.5.3.4 Testing the Pilot Valve for Correct Operation

Connect a fuel supply to the burner and turn on. Turn on the pilot light valve and light the pilot light. Check the pilot flame for stability and strength by trying blow it out. This should be difficult to achieve. Turn the pilot valve off and watch the pilot light flame. It should extinguish itself within five seconds as a maximum. If the flame does not go out, the sealing ball and/or the regulator body must be replaced.

7.6.4.5.3.5 Servicing Regulator Unit

Remove the regulator, as described in Section 5.4.4.1, and place in a clean environment.

Unscrew and remove the three socket head screws (21), which are located around the circumference of the pilot valve handle. Remove the circlip (9) situated on the centre shaft in the centre of the handle. This should only be achieved by using circlip pliers (grips). Care should be used to ensure that this circlip is not over-stretched during the removal process. If the circlip is twisted at all, it must be replaced. Gently ease the handle (2) off the regulator assembly. Remove the handle spring (11) and the washer (10) which is revealed, and store safely.

Using a peg spanner (Lindstrand Part No. BU999004), insert the pegs into the two holes of the spring retainer (12) and unscrew. Remove the main regulator spring (13). Gently pull the shaft of the piston (14) to remove the piston assembly from the regulator body (8).

Take care not to damage the PTFE lip seal (15), which is situated on the piston, whilst withdrawing the piston (14) over the threaded portion of the regulator body (8). If the piston pin (16) in the end of the piston assembly has not already been removed, it now should be, and stored.

Be careful to avoid putting the piston assembly down on a surface because it will naturally sit on the edge of the lip seal (15), which may be damaged as a result.

Unscrew the three screws (17) on the end of the piston and remove.

Remove the piston cap (18) to reveal the lip seal (15). Note the orientation of the lip seal (15). The spiral spring must face towards the piston cap (18). Inspect the outer edge of the seal for any scratches or marks which may cause a leak. If in any doubt, replace with a new seal.

Also inspect the bore of the main regulator body (8) for any scratches or marks. If any are detected, the complete body must be replaced.

Before replacing the lip seal (15), lightly grease the barrel of the piston (14) over which the lip seal is fitted. Gently push the lip seal onto the piston until it is hard up against the shoulder. Ensure that the seal is facing in the correct direction. Re-fit the piston cap (18) over the piston. If a Lindstrand regulator seal kit is used (Part No. BU002091), then three new cap screws (17) are provided. If this kit is not available, the existing cap screw threads must be carefully cleaned, to remove all of the sealant. Prior to installation, the screw threads must be coated with a small quantity of thread sealant, Loctite 577 (Loctite 579 in the US). This is the only approved sealant, no other may be used. Screw the three screws (17) until tight against the piston cap (18), then put the piston pin (16) into the hole in the middle of the piston cap.

Lightly grease the bore of the regulator body (8) and insert the piston assembly, again taking care not to damage the lip seal on the threaded portion. Place the main regulator spring (13) over the shaft on the rear of the piston.

Place the spring retainer (12) over this shaft and press down to over-compress the main spring. Note that the recessed side of the spring retainer (12) must be facing outwards. Screw the spring retainer (12) into the regulator body (8) using the peg spanner, until it will not go any further. Be careful to ensure that the thread is correctly engaged.

Spread a little grease on the washer (10). Place the washer into the centre recess on the inside of the pilot valve handle (2). On the outside of the regulator body, there are three machined sloping tracks. One of these tracks has its' innermost end located on a recessed portion. During re-assembly, this point must be aligned with the engraved "1" on the outer surface of the pilot valve handle.

Screw two of the three handle retaining screws (21) into the regulator main body (8) through the pilot valve handle (2). Leave one screw out to allow the handle to be aligned correctly. The handle retaining screws have a plain portion at the end of the thread and should not be confused with the regulator retaining screws, which are similar. Place the handle spring (11) over the piston shaft (14) so that it sits upon the recessed hole in the spring retainer. Offer up the pilot valve handle (2) and locate the other end of the spring against the washer located in the handle. Align the marks on the regulator body (8) and the pilot valve handle (2), as described, and compress the spring (11). Look through the hole of the omitted handle retaining screw and move the handle so that the hole is positioned above the recessed track in the regulator body. Screw both of the other handle retaining screws until they are tight, whilst keeping the handle steady. Insert and screw home the remaining handle retaining screw (21). Replace the circlip (9) on the end of the piston shaft (14).

Remove the larger "O" ring (19) which is positioned next to the shoulder on the outside of the main regulator body. Another, slightly smaller "O" ring (20) is positioned at the bottom of the regulator cavity in the main burner block. Remove this and inspect for signs of damage. If a regulator seal kit is available, discard the old "O" rings and fit the new ones, first covering them with grease. Note that the small "O" ring does not locate in the channel on the outside of the regulator body, and it should only be fitted as described above.

Ensure the cavity in the main block is completely clean before re-fitting the regulator assembly into the burner block. Replace the regulator unit into the burner by following the instructions in Section 7.6.4.5.3.3

7.6.4.5.4 SERVICING OF THE CROSS OVER VALVE

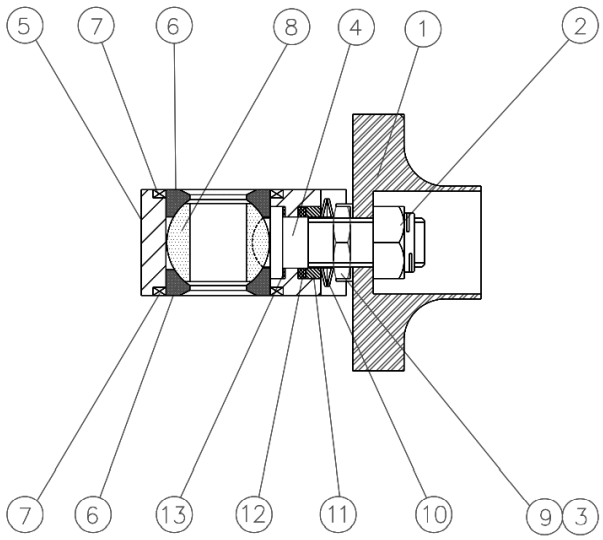


FIG 5.4.5.1. CROSS–OVER VALVE ASSEMBLY

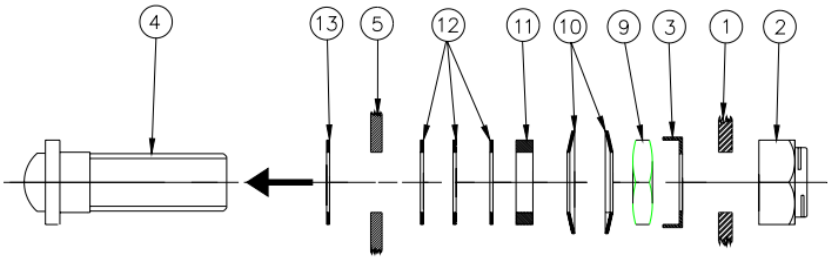


FIG 5.4.5.2. ASSEMBLY SEQUENCE OF CROSS-OVER VALVE STEM COMPONENTS

This is the valve which is situated between the two halves of the burner. Malfunctions of this valve will be observed in one of the following ways:

a. Propane leak through the stem of the valve or around the handle area.

b. Propane leaking from one or two of the valve side faces.

c. Propane appearing at the jets of the second burner with the cross over valve closed and the main blast valve open on the first burner.

Stem leaks can often be eliminated by adjustment, but the other two type of leak (b and c) are usually corrected by installing a new sealing kit (Part No. XX001003).

All numbers in brackets refer to the ballooned item numbers on Figures 5.4.5.1 and 5.4.5.2.

7.6.4.5.4.1 Correcting Stem Leaks

Whilst holding the valve handle (1) steady, unscrew the self-locking nut (2) in the centre of the handle using a 9/16" AF socket, and remove. Remove the handle (1) and the locking clip (3) from the valve stem (4). Whilst holding the stem still by placing a spanner on the two flats on the shaft, tighten the lower plain nut by ½ a turn.

Replace the handle (1) and nut (2) and test fire the burner to ensure that there is no further leakage. If leakage is still detected, then repeat the above process and tighten the plain nut by another half turn.

7.6.4.5.4.2 Replacing Valve Seals

Turn the valve into the "on" position. Loosen, but do not remove the eight screws which attach the cross mounting bracket to the burner cans. Unscrew and remove the four cap head screws which clamp the two halves of the burner together. Take care when removing the last screw that the complete valve body (5) does not fall out. Remove the valve body (5) by withdrawing the valve downwards from between the two burner halves.

It is essential to perform any service work on the valve in a clean environment. Tip the two ball seals (6) out of the valve. Lift the body connector seals (7) away from the valve body, being careful not to mark or scratch the body. Turn the valve handle (1) to the off position

to allow the ball (8) to be removed out of the side of the valve.

Remove the valve handle (1), as described above. Remove the locking clip (3) and unscrew and remove the plain gland nut (9). Turn the valve stem so that the two flats on the stem are aligned with the two longest sides of the valve. Gently push the stem (4) into the valve body (5) and remove the stem (4) through the side. Take great care not to scratch the body of the valve itself, whilst removing the valve stem. Remove the two disc springs (10), the spacer (11) and the three gland seals (12) from the outer recessed position around the valve stem. Remove the single gland seal (13) on the inside of the valve. This seal (13) is normally retained on the valve stem (4), so it may have been removed already.

Discard all the old components for which replacements are provided in the seal repair kit (3, 6, 7, 9, 10, 12 and 13).

Clean and inspect the valve body (5) and valve ball (8) for any marks or scratches. If any scratches are detected, the items concerned must be replaced. Remove the four new gland seals from the seal kit. These four seals are identical and therefore interchangeable. Smear a small amount of grease over each of the seals. Install one seal over the threaded end of the valve stem. Carefully re-insert the threaded end of the valve stem (4) through the valve body (5), in the same way as it was removed. Install the remaining three gland seals (12) onto the valve stem (4), along with the spacer ring (11), two disc springs (10) and the plain gland nut (9).

A wrench should be used on the two valve stem (4) flats to hold it steady. Tighten the plain gland nut (9) to a torque of 4.75 Nm (3.5 lbs ft). Install the locking clip (3) over the plain gland nut. Rotate the valve stem several times and readjust the plain gland nut as necessary. Note that over-tightening the plain gland nut (9) causes an unduly stiff action to the valve and reduces the life of the valve stem seals (12 and 13). Turn the valve into the closed position and slide the ball (8) onto the end of the valve stem (4). Open the valve to retain the ball in position. The new ball seals (6) and body connector seals (7) may now be fitted. Smear each of the seals with grease prior to installation. The grease helps to hold the ball seals in position during reassembly of the valve. Clean the two end faces of the burner blocks which seat onto the cross over valve assembly. Insert the valve into position and tighten the four valve retaining cap head screws in a diagonal pattern to a torque of 12.2 Nm (9 lbs ft). Re-install the valve handle (1) and tighten the self-locking nut (2) to retain the handle.

Re-tighten the eight screws which hold the cross bracket to the burner cans, and test fire. Pressure test the complete burner assembly.

7.6.4.5.5 SERVICING OF THE PRESSURE GAUGE

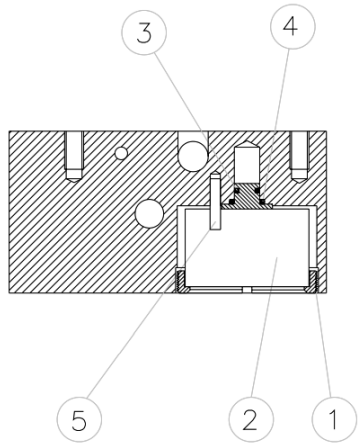


FIG 5.4.6 PRESSURE GAUGE INSTALLATION

One pressure gauge is provided for each separate supply system in the burner. Pressure gauge malfunctions are most commonly caused by a lack of, or insufficient venting of propane, prior to shutting the burner down. In this situation, liquid can become trapped within the burner and as it warms up it will expand. This expansion is normally achieved in the pressure gauge. Eventually, the pressure gauge is extended beyond its operating range and the bordon pressure tube is permanently deformed. When this occurs it will result in the pressure gauge not returning to zero when there is no pressure in the burner (a non-zero error). The pressure gauge must be replaced to rectify this fault.

All numbers in brackets refer to the ballooned item numbers on Figure 5.4.6.

7.6.4.5.5.1 Replacing the Pressure Gauge

Carefully place the long end of a 3 mm (1/8”) allen key (hexagon wrench) across the face of the pressure gauge and engage it in the two slots on the bezel ring (1). Undo the bezel ring (1) and remove. Insert two bent pieces of stiff wire down opposite sides of the gauge (2) and carefully pull the gauge away from the block.

Re-fitting is the reverse process of dismantling the pressure gauge. Lubricate the two “O” ring seals (3 & 4) on the back of the pressure gauge before installation. Also ensure that the alignment peg (5) in the burner block is fitted through the drilled hole in the back face of the pressure gauge body. Take care to ensure that the threads on the bezel ring (1) are correctly engaged before applying a tightening force. It should be noted that if these threads are damaged, the complete burner block must be replaced.

7.6.4.5.6 Servicing the Igniter Assembly

The numbers in brackets refer to the ballooned item number on Figure 5.4.3.

Unscrew the retaining socket head grub screw, which is shown in Figure 1, using a 3 mm allen key. This retaining grub srcew is situated on the outer facing side of the main block, into which the main feed hose attached. On this face, there are two visible screws. The correct grub screw is the smaller of the two and is situated closer to the burner coil. It is

not necessary to completely remove this grub screw, just loosen it sufficiently so that the complete igniter assembly may be withdrawn by carefully pushing on the igniter body, inside the burner can.

Ensure that the “O” ring situated on the outer body of the new igniter assembly has been lubricated with a small amount of grease.

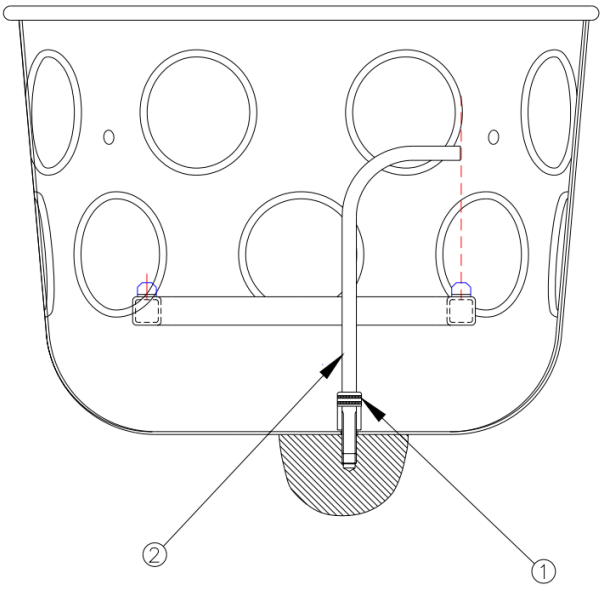
Insert the new igniter and push it into the burner block until it will go no further. Check that the gap between the electrode and the plate attached to the pilot light cup is approximately 4 mm. In some cases, the electrode is manufactured over-length. If a 4 mm gap cannot be achieved with the igniter correctly installed, then mark the electrode at the position which will give a 4 mm gap. Remove the complete igniter assembly and shorten the electrode by cutting the excess electrode away using sidecutter pliers.

Tighten up the grub screw to retain the igniter in position. Only use an allen key to tighten the grub screw, as this will prevent the screw from being overtightened.

Operate the igniter to ensure there is a spark between the electrode and pilot light cup. If there is any misalignment between the pilot light cup and the electrode, this can be rectified by unscrewing the 3 mm grub screw at the bottom of the pilot light cup. The pilot light cup may then be rotated so that the protruding plate is directly above the igniter electrode. Re-tighten the grub screw once the cup has been adjusted.

7.6.4.5.7 Adjustment of the Slurper Tube

FIG 5.4.8 SLURPER TUBE ADJUSTMENT



The slurper tube is located within the burner itself. It works by the passage of fast flowing propane vapour across the upper end, causing a suction in the tube itself. This in turn draws any water present within the burner can up the tube to be ejected into the burner flame. It is therefore important that the upper end of the slurper tube is precisely located within the flow of propane from the main jets. The numbers in brackets refer to item numbers ballooned on Figure 5.4.8.

The slurper tube is located in position on one of the locating screws at the base of the burner can. For adjustment, loosen this screw (1) and rotate the slurper tube (2) into the position shown in Figure 5.4.8. Tighten up the screw (11) and again check the positioning of the top of the tube. If it has moved due to the tightening of the screw, then the tube should be fine-tuned by gently bending the top of the tube until it rests in the correct position.

7.6.4.5.8 Bleeding of the Hydraulic Remote Burner Control

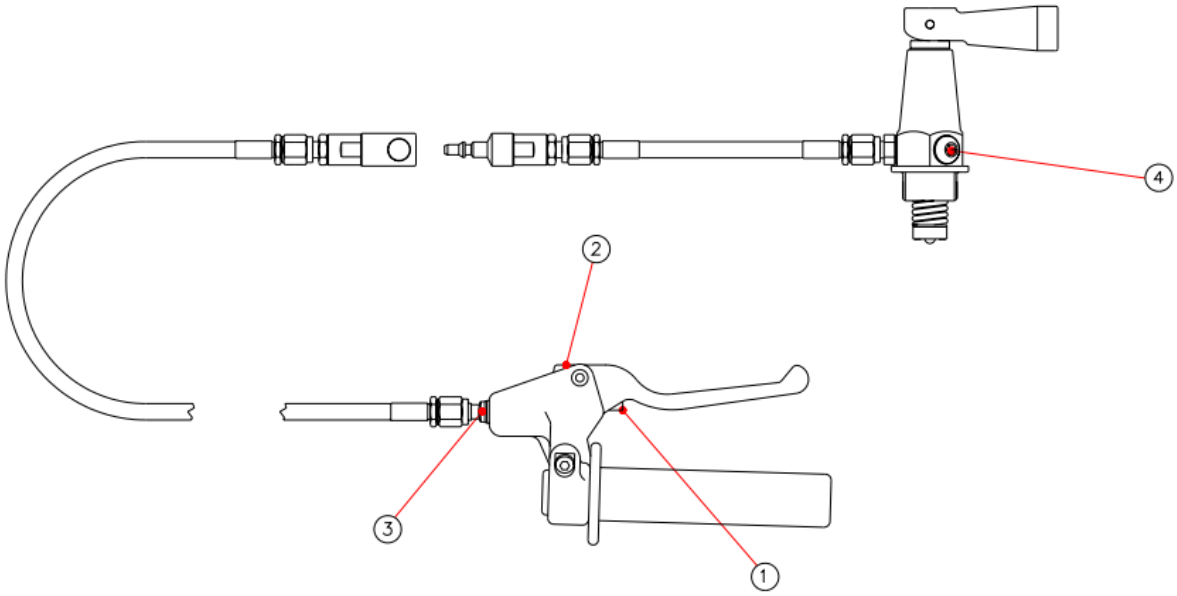


Fig. 5.4.9

The following instructions assume that the equipment supplied in an optional service kit is available.

The number in brackets refer to the ballooned item numbers in Figure 5.4.9.

Connect the quick release coupling so that the hand-held lever assembly and blast valve are connected. Turn adjuster (1) anti-clockwise as far as it will go. Slacken adjuster (2) until the lever is at the extent of its travel. Remove screw (3) and the washer.
Fill the syringe with oil and attach short tube to the end. Fit the small bleed adaptor to the hole (3). Fit syringe and tube to the small bleed adaptor.

On the blast valve bonnet, remove screw (4) and screw in the other bleed adaptor with washer. Attach long tube to bleed adaptor and place the other end in a suitable container. Pump the oil from the syringe through the system in one slow continuous movement. Once the oil begins to drain from the blast valve, keep pumping until no more bubbles appear in the tube.

Remove the long tube and bleed adaptor and replace screw and washer. Remove syringe, tube and bleed adaptor from the lever assembly and replace screw and washer.

Clean off all excess oil and adjust screws (1) and (2) so that the lever assembly can be operated comfortably and to remove any slack from the system.

7.6.5 INSTRUMENT REPAIRS

No Change

7.6.6 MAINTENANCE SCHEDULE

No Change

7.46.7 SUPPLEMENTS

The following Lindstrand supplements remain valid and must be inserted in Section 7 of the maintenance manual if applicable to the equipment in use.

HABMMSUP 1 Issue 1.2 Lindstrand Super Single Burner.
HABMMSUP 2 Issue 1.3 Jetstream Series 2 Double, Triple and Quad Burners.
HABMMSUP 3 Issue 1.5 Series 2 Cloudhopper Bottom End
HABMMSUP 5 Issue 1.9 Easy Access Baskets

7.6.8 REPAIR PARTS AND MATERIALS

See Lindstrand Illustrated Parts Catalogue, L_IPC and section 7.6.8.1 below.

7.6.8.1 Alternative repair materials.

The tables below identify “Cameron” equivalent part numbers for Lindstrand parts.

7.6.8.1.1 Burner and Fuel System parts.

Lindstrand Part No.	Lindstrand Part Description	Cameron Balloons Part No	Cameron Part description
BU-999-A-029	1/4” NPT to 3/8” BSP Hose Assembly	CB-76XX-1400 *	1/4” NPT to 3/8” BSP Hose Assembly Liquid Propane
BU-999-A-030	3/8” BSP to 3/8” BSP Hose Assembly	CB-76XX-4400 *	3/8” BSP to 3/8” BSP Hose Assembly Liquid Propane
BU1825 (CY5114)	Worcester Valve Repair Kit (WO 05 RK A44T)	CB-0392-0018	Worcester Valve Seal Kit
BU2026 (CY5129)	3/8” Dowty Seal	CH-3800-0003	3/8” BSP Dowty Seal
BU2041	Valve Spindle Long BU-002-A-041	CQ2041	Jetstream - Failsafe Valve Spindle Long
BU2046	Seat Carrier Sleeve BU-002-A046(1)	CQ2039	Jetstream - Failsafe Seat Carrier Sleeve
BU2050	Valve Spindle Short BU-002-A-050(2)	CQ2040	Jetstream - Failsafe Valve Spindle Short
BU2203	Post Block Seal BS113(Nitrile)	CT-8180-7188	Self Seal O-Ring
BU2217	M/Nitrile Gauge O-Ring Seal Small (BS008)	CU-7553-0012	Stem O-Ring
BU2045	Valve Spring	CU-7553-0009	Blast Valve Spring

* XX defines burner hose length. Lindstrand BU-999 series hose drawings have no specific length so the replacement hose length must be defined by measuring the hose to be replaced.

Lindstrand Part No.	Lindstrand Part Description	Cameron Balloons Part No	Cameron Part description
CY5121	Tema Male Nipple (P/N.3820)	CB-0671-0007	Tema 3800 Series Male Coupling
CY5122	1/4” BSP Dowty Seal pp45-a	CT-1300-0002	Dowty Seal Tema SOC/ ADPT
CY5130	BMV 344 Liquid Valve	CB-0824-0001	BM Liquid Valve
CY5138	Rego Seals Inner (BS114)	CB-2621-0000	Liquid Valve O-Ring Set
CY5139	Rochester Gauge Seals	CB-2561-0000	Contents Gauge Gasket
CY5149	Contents Gauge Bolt	CY-0006-3025	Contents Gauge Bolt T&C
CY1507	Rochester Gauge V20 / Worthington	CB-2551-0000	Contents Gauge Worthington
CY1508	Rochester Gauge V30	CB-2552-0000	Contents Gauge 44/60 ltr
CY1509	Rochester Gauge V40	CB-2553-0000	Contents Gauge 56/80
CY5156	5/8” BSP Dowty Seal pp45-e	CB-0671-0004	5/8” Dowty Seal
CY5175	BM Vapor Valve with PRV	CB-2883-0000	Vapor Valve with PRV T&C

Lindstrand Part No.	Lindstrand Part Description	Cameron Balloons Part No	Cameron Part description
HS6116	Tema Seal Inner (P/N.N617)	CB-2631-0000	Tema O-Ring Pack
HS6117	Tema Seal Outer (P/N.BS812)		
HS6113	Tema Female Coupling Body (P/N.3810)	CH-3800-0001	Tema 3800 Female
HS6139	Rego M7141F & S/S Backnut	CB-7900-0000	High Flow Hose Coupling
HS6150	Refuelling Bayonet Filler Valve	CH-6000-0023	Cargas Bayonet Filler Valve
HS6196	3/8" BSP Dynaquip Valve	CA-0000-8147	3/8" BSP Dynaquip Valve
CY5111	Liquid Level Gauge V20	CB2480-1021	FLLG – 186mm dip tube
CY5172	Liquid Level Gauge V30	CB2480-1021	FLLG – 186mm dip tube
CY5189	Liquid Level Gauge V40	CB2480-1022	FLLG – 220mm dip tube
CY050109	Tension Screw T30 cylinder	CY-0005-3035	Cap head SS screw M5 x 35 long

7.6.8.1.2 Greases

KSP125 grease (CBL Part Number CU-000-0010) may be used in place of molybdenum disulphide grease for applications where the components are immersed in liquid propane.

7.6.8.1.3 Karabiners

The Cameron 4-tonne karabiner part No CU-9825-0001 is approved as a replacement for the Lindstrand 5-tonne karabiner part No EN1907