

LG1E Series GasGuard Nozzle - Recommended Maintenance & Repair Procedures.

9th August, 2007

LG1E SERIES GASGUARD NOZZLE

RECOMMENDED MAINTENANCE & REPAIR PROCEDURES.

The following statements on the maintenance and repair of the Gasguard LG1E Series L.P.Gas Nozzle are designed to offer L.G. Equipment's (L.G.E.) authorised Distributors, O.E.M's and Service Centres recommended methods to bring back into serviceable condition such Nozzles which have been found to be faulty from any reason whatsoever.

L.G.E's recommendations are based on many years of experience in the manufacture, assembly and testing, and repair of such Nozzles. Whilst L.G.E's recommended procedures, as set out below, allow for proper repair and maintenance to be carried out on such Nozzles, L.G.E. cannot be held responsible for all Nozzles repaired under such procedures, testing satisfactorily when recommended text procedures are carried out.

L.G.E. has prepared and has available a "Trouble Shooting Guide" for Gasguard Nozzles generally. It recommends that all users of Gasguard Nozzles obtains and checks this Guide, which will help them in faster diagnosis of an operating problem and its correction.

Age, wear and abuse of the product can many times render repair ineffective/inappropriate, and it is considered sensible to replace full Sub-assemblies or even scrap the Nozzle where service inspection clearly indicates such action.

NOZZLE INSPECTION: It is recommended that the GasGuard LG1E nozzle be inspected every **6-12 months** after initial installment and **3-6 months** after every subsequent repair to uphold the safe operation of the LG1E nozzle.

A. The Gasguard LG1E Series Nozzle Assembly.

The L.G.1E Series Gasguard Nozzle is available in the following combinations:-

- i) LG1E - Nozzle only, without Strainer & Latch Assembly.
- ii) LG1ES - Nozzle with Strainer fitted but without Latch assembly.
- iii) LG1ESL - Nozzle with Strainer and Latch Assembly fitted.

All such Gasguard Nozzles are supplied with either a ½" or ¾" N.P.T. internal inlet thread for hose end connection. It is necessary to specify this thread when ordering appropriate spare parts.

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The L.G.1E Nozzle Assembly consists of the following Sub-assemblies:-

iv)	Body sub-assembly – ½”	-	Part No. 10-0785-804
	Body sub-assembly – ¾”	-	Part No. 10-0819-804
v)	Swivel Nut (Connector) sub-assembly	-	(LG7)
vi)	Lever sub-assembly	-	(LG5)
vii)	Valve Body sub-assembly	-	(LG4)
viii)	Latch sub-assembly	-	(LG8)
ix)	Strainer sub-assembly	-	(LG9)

The Body sub-assembly – item iv) above, also features an integral Inlet Swivel Sub-assembly, recognised as a L.G.2 x ½” (or ¾”), and can be supplied separately when required.

B. Tools Recommended for service on the GasGuard Nozzle.

L.G.E. recommends the following tools be available to facilitate repair and maintenance of the Nozzle:-

- i) Adjustable Spanner (Wrench) – Opening to 38mm (1.50”) across flats,
- ii) Internal circlip pliers,
- iii) Light ball-peen hammer,
- iv) 3.2mm (1/8”) dia. drift,
- v) Screw driver (medium size),
- vi) Bench vice,
- vii) 2.5 and 3.0mm across flats allen keys,
- viii) Spring clamps (medium size) - two only,
- ix) Sharp Nose Punch,
- x) Drill Bit – 5mm dia.

C. Assembly Grease recommended for service on the GasGuard Nozzle.

L.G.E. recommends and uses the following greases for general lubrication of moving parts and threads in the assembly of the GasGuard Nozzle:-

- i) Aeroshell 22 (Grease) or equivalent grease for use on all threads – Apply to external threads only,
- ii) Dow Corning Molycote FS3451 Fluorosilicone Grease (Molycote) for use on all dynamic O Ring seals – a thin film of Molycote is totally adequate.

The particular grease should be applied sparingly by a good quality small brush.

L.G.E. particularly recommends the use of the above greases where ambient temperatures can get down to -55 degrees Celsius. Of course they provide satisfactory properties up to +80 degrees Celsius.

The above greases are available from most lubricant specialist outlets.

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D. MAINTENANCE & REPAIR PROCEDURES.

a) Body Sub-assembly - refer Dwg. No. X0819

i) Inlet Swivel - Items 5 through 12.

1. The Inlet Swivel is maintained by firstly removing same from the Nozzle Body(1).
2. Remove the Locking Screw (13) and unscrew the Inlet Swivel from the Nozzle Body via the spanner flats of the internal Swivel Body (5).
3. Remove the Ball Race Plug (12) and remove the Ball Bearings (7) –13 only by counter-rotation and if necessary using some turps or similar to loosen the ball race grease. Pull apart the Internal and External Swivel Bodies. Remove all Seals, Back-up Rings and discard.
4. Clean all parts and wipe dry. Obtain and check new Seals etc. from the L.G.3SW Seal Set for the Inlet Swivel, i.e. items 8, 8A, 10, 10A, 11.
5. Apply a thin film of Molycote or similar grease to the Seal areas and Ball Race grooves of both the Internal and External Swivel Bodies.
6. Assemble the Main O Ring Seal –2 off (10) then its Back-up Ring (10A) to the Internal Body, ensuring that the concave section of the Back-up Ring is against the O Ring. Ensure that this set is properly housed square in bore of the Internal Body.
7. Assemble the O Ring Dust Seal (11) to the External Body.
8. With an easy twisting and pushing motion, assemble the External Swivel to the Internal Swivel. Place this assembly in the vice, using the flats of the Internal Swivel, and assemble the Ball Bearings (7) through the hole concerned. A slight axial pressure may be necessary to insert the first Ball, thereafter they can be inserted by turning the External Swivel Body slowly to facilitate assembling all 13 Ball Bearings.
9. Fit the Ball Race Plug (12) to the hole, ensuring that its extraction hole is facing outward.
10. With a slight smear of grease to the external diameters and external thread of the Swivel Assembly only, fit the O Ring Body/Swivel Seal (8) and then its Back-up Ring (8A) to the bore of the Nozzle Body. Refer to para 6 above for orientation of Back-up Ring to this O Ring.
11. Screw connect the Inlet Swivel Assembly to the Nozzle Body (1) using a spanner on the flats of the Internal Swivel (5). Screw both together to the face of contact with a maximum 41 Nm (30 ft.lbs.) torque. Assemble Locking Screw (13) to Nozzle Body with Allen Key.
12. Rotate External Swivel relative to Internal Swivel. This rotational torque may be high initially, but it will become easier with use.

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ii) Pawl Sub-assembly - Items 2,3 and 4.

1. In the unlikely event of maintenance required on this Pawl Sub-assembly, unscrew the Pawl Adjusting Nut (4), remove the Pawl (2) and Spring (3). Check all three (3) Items for damage, and if replacement of any part is necessary, it is recommended that all three (3) Items be replaced with new parts.
2. Use a little Grease on the Body internal thread, assemble the Spring, Pawl and Adjusting Nut, preferably with a slotted screw driver. Check that the Pawl leading radius point is 3.9 – 4.0mm. from the machined face of the Nozzle Body. Using a sharp nose punch and hammer, punch the Nozzle Body next to the Pawl Nut. This stops Pawl Nut rotation in service.

b) Swivel Nut Sub-assembly (LG7) - refer Dwg. No. X0786

1. Remove Swivel Nut Sub-assembly from Nozzle by removing Split Pin (5) of LG5SL lever Sub-assembly, withdrawing the Lever Pivot Pin (4) of same and remove the Swivel Nut Sub-assembly.
2. Unscrew the Ball Plug (3) of the Swivel Nut Sub-assembly and remove the Ball Bearings - 31 only. A small amount of turps or similar dropped into the Ball Plug screw hole could assist the Ball Bearing removal. Any foreign matter or residual thread sealant can be cleared from the screwed hole using a 5mm dia. drill bit.
3. Withdraw the Swivel Nut (1) and remove the Internal (7) and External (6) Lip Seals from their grooves in the Slide Sleeve (5) and discard same. Remove the L.G.6 Nose Piece Sub-assembly.
4. Thoroughly clean the L.G.6 Nose Piece, inspect tail clevis for wear or damage, then remove Nose Piece O Ring and replace with new O Ring (Part No. 10-0118-707).
5. Clean all parts removed and to be used in the re-assembly of this L.G.7 Sub-assembly and dry thoroughly. Apply a thin film of Grease to the internal machined surface of the Swivel Nut and external machined surface of the Slide Sleeve, especially in the ball race groove area.
6. Apply a thin film of Grease to the outside diameter of the Flange of the L.G.6 Nose Piece.
7. Assemble the External Lip Seal (7) into its groove in the Slide sleeve. This is facilitated by using a smooth 3mm dia. stainless steel rod, placing the Lip Seal over same, and assembling same to the external groove, diametrically opposite to the rod, and whilst rotating the rod around the outside diameter of the Slide Sleeve , ease the Lip Seal onto the Slide Sleeve and thence into the groove
8. Ensure that the Lip Seal (8) is sitting squarely and untwisted in its groove and the Lips facing towards the front of the Nose Piece.

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9. Assemble the Internal Lip Seal (8) into its internal groove of the Slide Sleeve, with the same precautions as per the External Lip Seal (7) above. Lightly smear Grease onto the exposed Lips of both Seals and lightly grease the external surface of the Slide Sleeve.
 10. Insert the L.G.6 Nose Piece Sub-assembly (4) into the Swivel Nut (1) and ensure that it is sitting squarely and centrally against the back of the ACME thread of same. Gently rotate and push the Slide Sleeve with Lip Seals into the Swivel Nut (1) and align the ball race groove of the Slide Sleeve with the Ball Plug tapped hole of the Swivel Nut.
 11. Hold the Swivel Nut lightly in a vice with the Ball Race Plug hole facing upwards and insert the thirty-one (31) only cleaned Ball Bearings (2) into the groove at the same time slowly rotating the Slide Sleeve to assist entry.
 12. Apply a small amount of Loctite 262 Thread locker or similar to the Ball Plug (3) and screw same into its position flush with the Lug of the Swivel Nut.
 13. Rotate the Swivel Nut (1) on the Slide Sleeve (6) to ensure free movement of same.
 14. Place on one side for final assembly to the repaired LG1E Nozzle.
- c) **Valve Body Sub-assembly (LG4) - refer Dwg. No. X0802A.**
1. Unscrew Valve Body Assembly from Nozzle Body, holding Nozzle in a vice and applying close fitting wrench to the flats on the Valve Body (1). Discard the Nozzle/Body/O Ring Seal (4).
 2. Remove Circlip (5) with pliers and remove spring Guide (3), Ball Valve and Spring (10).
 3. Remove Valve Body/Slide Sleeve Spring (9), place Valve Body in vice, using the flats of the Body and carefully apply close fitting wrench pressure to unscrew the U cup Spacer Housing (7).
 4. Remove and discard U cup Seal (6), Housing O Ring (8) and Valve Seat (2) from the Valve Body.
 5. Thoroughly clean all metal parts, and closely inspect the seating face of the Ball Valve (10a) for pitting due to corrosion. If there are signs of corrosion, replace the Ball Valve.
 6. Using parts from the L.G.3 Seal Kit, fit the Valve Seat (2) into its recess in the Body (1), followed by the Housing O Ring (8) and U Cup Spacer Housing (7).

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7. Fit the U cup Seal (6) to the U cup Spacer Housing (7) in its correct orientation. Lightly grease the U Cup Spacer Housing and screw the Housing (7) to the Valve Body (1) with a close fitting spanner or wrench to a maximum of 14 Nm (10ft.lbs.) torque. Check that the Seat (2) is squared up with the internals of the Valve Body (1) and the U Cup Spacer Housing (7) does not distort the Valve Seat(2).
8. Place the Ball Valve/Spring assembly (10) onto the Valve Seat (2), fit the Valve Spring guide (3) to the Spring and reassemble the Circlip (5), ensuring that it is firmly seated in its groove.
9. Fit the new Nozzle/Body/O Ring Seal (4) to the Valve Body, slightly grease the outside diameter of the Valve Body (1) and fit the Valve Body/Slide Sleeve Spring (9).
10. Screw the Valve Body Sub-assembly to the Nozzle Body, using a smear of Grease on the external thread of the Valve Body (1). Tighten to a maximum of 41Nm (30ft.lbs.) torque.
11. If a Strainer Sub-assembly L.G.8 is to be fitted, place the cleaned Strainer into the bore of the Nozzle Body and screw connect the Valve Body Sub-assembly to the Nozzle Body as per para.10 above.

Note: Strainer Sub-assembly – Part No. 10-0712-804 has been superceded. O Ring – Part No. 10-0214-703 is still available when reusing this superceded Strainer.

d) Lever Sub-assembly LG5SL – refer Dwg. No. X0768.

1. A new Lever Sub-assembly L.G.SL replaced the L.G.5 Lever Sub-assembly in October, 1997. This new Lever design eliminates the ear at the Nozzle Body/Lever interface. If the Nozzle body or L.G.5 Lever shows excessive wear, use the new LG5SL Lever Sub-assembly. This will help bring the Nozzle flow characteristics back to that of a new Nozzle.
2. If the LG5SL Lever Sub-assembly is fitted to the Nozzle, check for wear on the two Slippers (5). The Slippers can be rotated and changed to the opposite side of the Lever Clevis to improve the operating characteristics of the Nozzle. Replace the Slippers if necessary.
3. Check that the Lever Latch Pin (3) is not worn, replace if necessary.

e) Latch Sub-assembly LG8 - refer Dwg. No. X0787

1. If a new Latch Assembly is to be fitted to the Nozzle, firstly remove the damaged Assembly by carefully knocking out the Latch Pin (4) with a 1/8" (3mm.) drift, and discard the Assembly.

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2. Gently hammer one end of the new Latch Pin (4) to one of the Bushes (3) oriented as per the Dwg. No. X0787.
3. Assemble the special Latch Spring (2) to the Latch (1) using the closed end of same, push the Bush fitted Latch Pin through the Spring circle and start hole of the Latch (1). Fit this assembly to the Nozzle Body rear web, aligning the free end of the Latch Pin (4) with the 1/8" dia. hole in the web and carefully tap the fitted Bush (3)/Latch Pin (4) through the hole, ensuring that the open end of the Latch Pin extends through the Spring circle on its opposite side.
4. Using a suitable metal block as a steady, carefully apply the other Bush (3) to the free end of the Latch Pin (4) and tap home flush with the end of the Latch Pin.
5. Centralise the Latch Assembly with the Flange of the Nozzle Body by carefully tapping either Bush.
6. Operate the Latch Assembly for free and spring return condition and, on assembly of the Gasguard Nozzle, check its proper latching to the Lever Latch Pin (2) of the L.G.5SL Lever Sub-assembly.

f) Assembly of Gasguard Nozzle - refer Dwg. No. R0788.

1. You will have six (6) Sub-assemblies ready for assembling into a Nozzle Assembly, i.e. Nozzle Body, Swivel Nut, Valve Body, Lever and Strainer (optional) and Latch (optional).
2. Having already assembled the Nozzle Body Sub-assembly to the Valve Body Sub-assembly (with or without Strainer Assembly fitted), assemble the Swivel Nut Sub-assembly to the Valve Body Sub-assembly and ensure that there is free but spring loaded movement between the two.
3. The Lever Sub-assembly can now be fitted. Firstly, fit the Lever to the Nozzle Body, ensuring that the fork at the heel of the Lever is engaged on the web of the Nozzle Body. Then fit the two Slippers to the slipper pivot points on the lever. Check that the Slipper orientation is correct
4. Resisting the Valve Body/Slide Sleeve Spring (8) against a firm stop, push the Nozzle Body/Valve Body Sub-assembly into the Swivel Nut Sub-assembly, until the pivot pin hole in the Slide Sleeve (9) aligns with the holes in the Lever. Fit the Lever Pivot Pin (3) fully through these aligned holes.
5. Operate the Nozzle Lever in the normal manner to ensure free and full operation of same. Prior to operation of the Lever, the open end of the Pawl should be no more than 1.0mm free of the Pawl teeth in the Swivel Nut.

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LG1E NOZZLE TEST PROCEDURE

LGE recommends two (2) series of tests be carried out, i) **static** and ii) **dynamic** flow test.

It is recommended that the Nozzle be flow and pressure tested using LPGas (propane) as the testing medium (when performing Dynamic tests) at the normal flow pressures of 1300-1600 kPa (200-220 p.s.i.) experienced in the field. If LPGas (propane) is not available, a satisfactory substitute testing medium is bottle nitrogen set on its regulator at 1800 kPa or Compressed Air.

L.G.EQUIPMENT STRESSES THAT THE OPERATING PROCEDURES OVER-LEAF, BE PRECISELY PERFORMED BEFORE IT GOES ON-SITE AND THEN AGAIN ON THE SITE ITSELF.

STATIC TEST:

- 1) The **Static Test (with pressurised Air or Nitrogen)** should be performed firstly without connector (B) or Lever Assy (C), the Nozzle is connected to the supply hose, essentially fitted with an isolating valve immediately upstream of the hose end connection to the Nozzle. Apply pressure from the pressure unit at the above stated pressures, and slowly open the isolating valve.
- 2) With the Nozzle closed, check gas pressure security at all joints on the Nozzle especially at the Inlet Swivel connection to the Nozzle. Carry out this test by immersing the Nozzle Assembly in a container of detergent loaded water. Whilst checking pressure security, apply a bending moment to the Inlet Swivel of approx. 27Nm (20 foot pounds) whilst rotating the Swivel Assembly slowly.
- 3) Once point 2) is completed apply Connector (B) and Lever Assy (C), without allowing gas into the Nozzle, connect the Nozzle Assembly via its ACME thread to an approved (vehicle) or Adaptor (ie. blanked connector), and check that the Nozzle locks firmly onto the Adaptor when the Lever is fully operated. If firm locking takes place, it can be assumed that the Valve of the Nozzle has opened and would allow Gas to pass through same during normal pump operation.
- 4) Check Lever movement and where fitted that the Latch engages when the Lever is pulled back and allowed to rest open. Disengage the Latch by pulling back on the Lever and releasing to return Lever to the closed position.

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DYNAMIC FLOW TEST:

- 1) For a **Dynamic Flow Test (with LPGas)**, connect the Nozzle to a vehicle connector fitted to the vapour return line on a dispenser or test rig, with a down-stream connector to a receiving tank.
- 2) Allow gas into the Nozzle and check for gas vapour while valve is closed (ideally spraying a liquid diluted with a detergent, to see any apparent leaks).
- 3) Activate Lever to allow gas flow. Check for leaks from the Connector sides (using same method as above). On releasing the Lever check that there is a small amount of gas caused to escape to atmosphere.
- 4) At the conclusion of satisfactory static and dynamic tests, close the hose end isolating valve, operate the Lever to depressurise the Nozzle and remove the Nozzle from the supply hose. Fit the Split Pin (5) of the Lever Sub-assembly to the Lever Pivot Pin (4).

IF ALL THE ABOVE ARE CARRIED OUT WITH CARE AND ATTENTION TO DETAIL, YOUR GASGUARD NOZZLE WILL PROVIDE YOU WITH SATISFACTORY SERVICE. HOWEVER, L.G.E. CANNOT BE HELD RESPONSIBLE FOR ANY INCIDENT, ACCIDENT OR OTHER SITUATIONS WHICH MIGHT OCCUR WHEN FOLLOWING THE ABOVE REPAIR AND MAINTENANCE PROCEDURES.

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