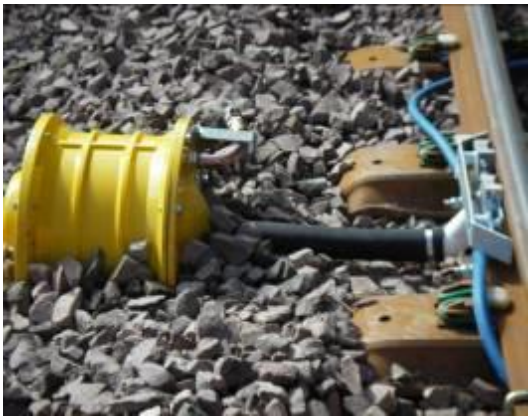
LUBRICURVE 50
Installation & Maintenance Manual

TRACK MOUNTED, MECHANICAL, RAIL AND WHEEL FLANGE LUBRICATOR SYSTEM

Model Variants:

- 2 Blade Systems
- EasiBlades
- 4 Blade Systems
- Standard Blades



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Contents

1 General

- Health & Safety legislation requires that LubriCurve rail lubricators are fitted by trained personnel only; warranty will also be affected if un-trained teams work on the LubriCurve products. Whitmore Rail can provide training courses.

  A general instruction sheet is included with each LubriCurve pump supplied, this Manual provides more complete information and should be used to support training provided by Whitmore Rail.

- This Instruction Manual is intended to be generic and concentrates on LubriCurve systems to suit Flat Bottom and Bull Head rail types, in particular 98,109, 110, 113lb, UIC60 flat bottom rails and 95lb bull head rail applications.

- Only lubricator grease approved for use by Whitmore Rail can be used in the LubriCurve system. Use of other greases will invalidate warranty.

2 Product Transport / Storage

- Goods are packed and delivered to requested address in a form that is suitable for the product given good practice in the off-loading by the receiving company.

- LubriCurve 50 systems are delivered on the basis that they will be installed quickly.

- Systems are not intended for outside storage, equipment should be off loaded and stored inside a secure watertight building until required for installation.

IMPORTANT:
Maintenance and repair of the lubricator and reservoir should only be carried out by trained personnel. Compressed springs inside the lubricator may be dangerous if handled incorrectly.

3 Instruction Manual Product Summary

Instruction Manual covers installation and maintenance of the mechanical / hydraulic lubricators in the Whitmore Rail LubriCurve 50 range.

There are many variants to suit different rail sections along with blade types and forms, this manual is intended to be generic and cover all forms.

Contact Whitmore Rail for any specific model information or assistance.

A variety of parts to assist with installation efficiency are available and such items and their use are available from Whitmore Rail.

4 Main Component Definitions

Reservoir	The reservoir is the cylindrical grease container that stores the grease. Internal springs and piston forces the grease into the lubricator pumps via feed hoses.
Non-Return Filling Valve	The non-return filling valve is fitted to the reservoir; this is where the grease is pumped into the reservoir (when fitted to the lubricator) via a suitable hand operated or motorised pump.
Feed Hose	This is the hose linking the reservoir to the pump inlet. The hose is secured using a hose clip at each end of the hose. The feed hose transfers the grease from the reservoir to the pump inlet pipework.
Blade (Grease Dispensing Unit)	There are generally two or four Blades used with each lubricator, each consisting of three rectangular plates, back plate middle plate and grooved front plate). Each Blade is fitted to the rail using two rail clamps, which are secured to the rail by a hook bolt, nut and washer per clamp. The Blade has multiple ports at the top of the grooved plate, which allows the grease to be delivered to the gauge corner and/or gauge face of the rail for the train wheels to pick up and spread along the curve.
Delivery Hose	There is one 3-metre length of delivery hose supplied with each lubricator, which has to be cut into two suitable lengths to fit between a pump body and a Blade assembly. The hose is secured using a hose clip at each end of the hose. The delivery hose transfers the grease from the pump outlet to the Blade inlet.
Grease Inlet	This is part of the pipework that links the feed hose to the inlet pipe.
Pump Unit	The pump unit consists of two pump bodies (connected by an inlet pipe) and is mounted to the rail by the pump support brackets via 2 pump rail clamps
Inlet Pipe	The “T” piece assembly connection that links the grease inlet to the two pump bodies.

Pump Body	Each pump contains: 1 plunger (complete with integral non return valve) 1 plunger height adjustment screw 1 plunger return spring 1 grease outlet non-return valve 1 bleed screw 1 delivery hose outlet pipe 1 pump support bracket. The grease is delivered from the reservoir via the feed hose / ”T” piece and fills each pump primary chamber of the pump unit. When the system is primed the grease then fills the secondary chamber via the plunger integral non-return valve. Once the plungers are depressed by the train wheels, (or manually) the grease is transferred via the outlet non-return valve to the outlet pipe and then through to the delivery hoses. On the return stroke of the plunger its integral non-return valve opens and allows grease to flow into the secondary chamber from the primary chamber.
Plunger Height Adjustment Screw	A special locking screw operated with a 2.5mm Allen key that is adjusted from the top of each pump body to adjust the height of the plunger. A pressure pad operates on the side of the adjuster screw. The higher the plunger in relation to the top of the rail the greater the grease output
Plunger Return Spring	There is one plunger return spring in each pump body. The springs return the plungers to its static position after the plunger has been depressed by the train wheel (or manually).
Grease Outlet non-Return Valve	There is one grease outlet non-return valve, in each pump body. The non-return valve acts as a stop valve, preventing the grease in the Blade path from being drawn back into the pump body as the plunger rises. Once the plunger is depressed by the train wheel, (or manually), the grease is transferred from the secondary chamber through the outlet non-return valve, permitting grease to flow through to the Blade via the delivery hoses.
Bleed Screw	There is one bleed screw on each pump body. Once open any air trapped in the secondary chamber, is able to be released when the plunger is operated or fully raised.

5 Site Preparation

- To install a LubriCurve 50 lubricator, the ballast has to be cleared to allow the reservoir to be seated correctly in a position, clear of the trains. There also needs to be sufficient clearance made in the ballast for the feed hoses and the rail clamps that secure the pump and the Blades.

- The equipment needed for this work is.
    - A shovel or ballast fork whichever one is the most suitable.
    - All relevant P.P.E. needed to carry out the works safely.

- The lubrication systems outlined are heavy and care should be taken in general safe mechanical handling of the units to the install site. Two people should handle pump storage boxes (typically 28kg) and reservoirs (typically 54kg), carry kits are available for the reservoir (Part No, LCS102-05).

6 Preparation of Main Components for Installation

Application	Ensure the correct pump type has been selected for the application; part numbers and descriptions are included on each pump case.
Packing Case	Cases are delivered damage free and complete. Ensure the case has not been damaged during storage or transport to rail site, should the case be broken the contents should be carefully checked with reference to the contents list included within each pump packing case. Dispose of all packaging responsibly.
Pump Unit	Visually inspect for any casting defects that will affect its operation. Ensure that both the pump unit brackets are not damaged and that both bolts are present on each bracket. Ensure that each outlet non-return valve at the base of the pump body is fully tightened into each pump body. Ensure that there is one bleed screw in each pump body and that they are fully tightened. Ensure that each pump body has one grease outlet pipe attached. Ensure that the plunger is able to be depressed manually and returns freely.
Blade	Ensure that it is not bent or damaged and all ports are free from blockages. Ensure that all bolts are present and are fitted securely. Ensure that the hose inlet tails, which the delivery hoses attach to, are in place and are not damaged.
Clamps	Ensure that both pump and Blade clamps are not damaged. Ensure that the threads on the clamp studs are not damaged. Ensure that the threads on the hook bolts are not damaged.
Hoses	Ensure that the hoses are intact and free of holes and splits.
Reservoir	Visually inspect for any casting defects that will affect its operation. Ensure that all bolts are present and are fitted tightly. A non-return filling valve is fitted tightly and the internal ball is free moving.
Serial Numbers	Pumps and Reservoirs are supplied with unique serial numbers, these should be recorded prior to installation and recorded on installation record sheets as required

7 Pump / Reservoir Installation

7.1 Two Blade & Four Blade Systems

Two blade systems are generally installed with running rail blades on the high rail with pump / reservoir also generally on that rail. Four blade systems are generally installed ahead of a series of reversing curves with two blades on each rail.

Installation of components from either system is covered in this manual but with notes on four blade installation directly below.

7.1.1 4 Blade Systems

- Typical layout is shown in the following images; one pair of blades to the right of the pump / reservoir and on the same rail and the second pair of blades on the far rail and to the left of the pump / reservoir.
- Each pair of blades has a 'T' piece midway between the blades and the hose from the T's vertical leg routes to each of the pump bodies.
- The hose between each blade and the T must be of identical length.

- Plunger heights are generally set to 1mm (see 7.7) on 4 blade systems.

7.1.2 2 Blade Systems

- A typical layout has blades to the right of the pump / reservoir and one to the left on the same rail.
- The hose runs from each blade to the nearest pump body.
- Plunger heights are generally set to 0.5mm (see 7.7) on 2 blade systems.

7.2 Fitting the Pump Unit Clamps, Flat Bottom Rail

7.2.1 Once the bed that the pump is to be fitted to has been identified, lay the pump unit on the ballast adjacent to the rail (on the cess side) to show the positions that the pump unit clamps need to be fitted.

7.2.2 Locate the 70mm long special hex bolts through the upper holes of the clamp with the hexagon head located in the clamp slot. Both pump unit clamps can now be fitted to the rail.

7.2.3 The main part of the clamp is fitted on the field (outside) side of the rail with the threaded stud at the top and facing away from the rail.

7.2.4 The hook bolt is fitted under the rail with the hook clasping on the foot of the rail on the 4' side with the threaded part inserted through the hole at the base of the clamp.

7.2.5 The washers and nut are then fitted to the hook bolt and fastened tight. Bed the clamp fully on the rail foot by striking the clamp base with a hammer (do not damage the rail foot or the clamp thread). Retighten the Nyloc nut.

Repeat for the second clamp.

7.3 Application Variation - fitting the pump unit clamps, Bull Head rail

7.3.1 Rail clamps are of a different form for the Bull Head Rail. The clamps consist of two sections that fit around the rail flange.

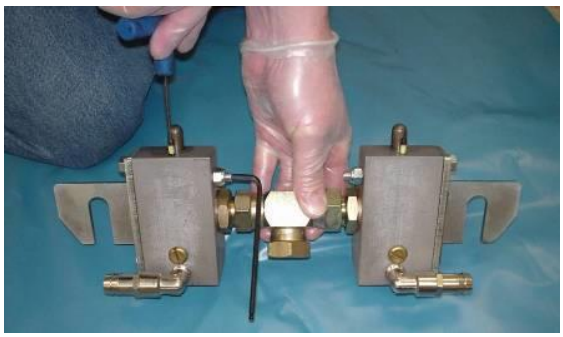
7.3.2 The main part of the clamp (hole and machined slot) is fitted on the field (outside) side of the rail. Locate the 70mm (3") long special hex bolts through the upper holes of the clamp with the hexagon head located in the clamp slot before fitting to rail.

7.3.3 The rear half of the clamp is fitted under the rail with the 160mm long bolt inserted through the hole at the base and then through the front clamp.

7.3.4 The washers and nut are then fitted to the hook bolt and fastened tight. Bed the clamp fully on the rail foot by striking the clamp base with a hammer (do not damage the rail foot or the clamp thread). Retighten the Nyloc nut.

Repeat for the second clamp.

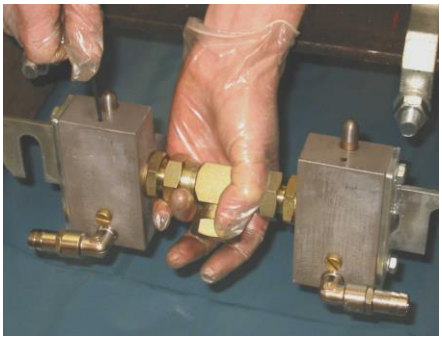
7.4 Fitting the Pump Unit



7.4.1 Using a 13mm spanner, loosen the screws on the inner face of the pump, ¼ turn is sufficient. This screw applies locking pressure to the plunger adjuster screw via a nylon pad. Note that on pre 2004 models a 4mm Allen Key is required in place of the 13mm spanner.

7.4.2 When initially delivered the pumps will be supplied with plungers set at a nominal height of 11mm above the pump body, the head of the 5mm special screw will be visible within the pump body.

7.4.3 A 2.5mm Allen Key is used to adjust the plunger height to a maximum. Note: screws must not be adjusted to this height, since this may result in damage when train wheels pass.



Prior to January 2004 the side pressure pad was not used.
Note: the adjusting screws are designed for use and adjustment during initial installation only, the adjusting screws include an anti-vibration feature to maintain the setting. Should further adjustment be needed then the screw should be unwound to clear the pump body, oil / grease contamination removed and Loctite 222 applied to the thread prior to re-fitting. New adjusting screws can be obtained from Whitmore Rail, (see parts list LCS200-22).

7.4.4 Hand tighten the two brass coloured swivel nuts between the pump bodies with the inlet pointing down and out. This will draw the pump bodies together.

7.4.5 Slightly loosen the two M8 bolts on each pump bracket, fit the pump unit onto the clamp studs. Place M16 packing washers over the Rail Clamp stud and behind the pump bracket such that the pump bracket is not strained on tightening of the fixings and that the pump body is touching the railhead.

7.4.6 Push the pump unit down as low as possible, fit one M16 flat washer and full nut to each stud and tighten.

7.4.7 Ensure the plunger and adjusting screw cannot contact the passing train during this time.

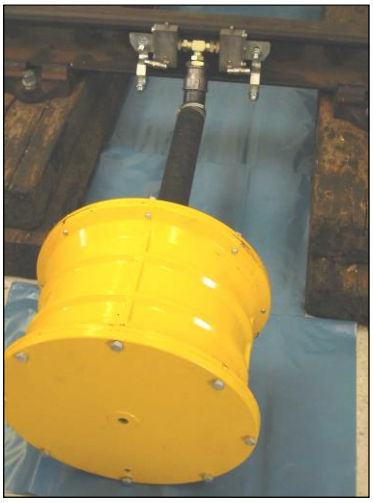
7.4.8 Fit the grease inlet to the pump inlet ‘T’ piece (between the two pump bodies) and tighten the ‘T’ Piece nut ensuring that the inlet is perpendicular to the rail. This connection must be tight to avoid future leakage; PTFE tape or Loctite 542 hydraulic thread sealant can be applied to enhance the joint integrity.

7.4.9 Push the grease inlet down until it almost touches the foot of the rail and tighten the two remaining ‘T’ piece nuts. This connection must be tight to avoid future leakage.

Alternative for Bull Head Pumps

The fitting process is the same for Bull Head pumps; the product differences are with the pump support bracket.

7.5 Fitting the Feed Hose and Reservoir



7.5.1 Slide a feed hose clip over one end of the feed hose and fit onto the outlet pipe of the reservoir. Tighten the hose clip.

7.5.2 Dig out the ballast so that the reservoir outlet is in line with the inlet of the angled pipe that is fitted to the pump. Bury reservoir at angle and approx. half depth to secure it in position, (see front cover picture).

7.5.3 Slide a feed hose clip over the open end of the feed hose and fit onto the angled pipe. Tighten the hose clip.

7.5.4 The feed hose may need to be cut due to the local conditions.

7.5.5 Position the reservoir into the space dug in the ballast ensuring that there are no kinks in the feed hose.

7.6 Filling the System

7.6.1 Once the reservoir is fitted to the pump unit, fill it up with grease:

- Remove the filler dust cap and store safely.
- Attach a suitable drum pump to the 3/4” snaplock filling point and secure locking arms in the clamp position.
- Operate the hand pump measuring piston depth periodically to a reading of 80mm from reservoir front plate to rear most surface of piston.

Do not overfill the reservoir

Flat Back Plate (older reservoirs)		**Top Hat Back Plate (newer reservoirs)**	
Full	**80mm**	**Full**	**80mm**
Empty	**225mm**	**Empty**	**280mm**

- Remove the hand pump and replace the reservoir dust cap.

7.6.2 Once the reservoir is full, open the two brass bleed screws until grease flows out of the screw grooves. If necessary operate the plungers until grease flows.

7.6.3 Once the grease is flowing hold down the plunger fully and close the bleed screws, this process prevents air being drawn back into the system.

Note: A reservoir spider (Part No. LCS102-04) should be available at this stage should it be necessary to lock the reservoir piston back if the hose or coupling need to be removed for any reason.

7.7 Setting the Pump and Plunger Height

7.7.1 **Error! Reference source not found.**A Whitmore Rail pump setting tool will assist this process (Part No. LCS104-02). Position the pump setting tool over the top of the plunger so that the short angled piece is pointing down towards the top of the pump body. Using a 2.5mm Allen key lower the plunger until the short section of the tool is touching the top of the pump body.

Alternatively, a similar procedure should be followed so that the top of the plunger is set 11mm above the pump body.

7.7.2 Loosen the two pump unit M16 support bracket nuts.

7.7.3 Raise both pumps until the tops of the plungers are level with the top of the rail using a plunger setting gauge (not supplied) and tighten the nuts.

7.7.4 Rotate the pump bodies in relation to the pump bracket to lean the plungers towards the railhead, then secure the two M8 fixings on each pump body.

7.7.5 Using a suitable gauge / measurement device and 2.5mm Allen key, raise the plungers to their initial setting height of 0.5mm above the top of the rail. Note: Subsequent adjustment is usually necessary to the adjust grease output to suit local traffic / wheel pattern. The typical range will be between 0 and 1mm relative to the top of the rail head, in extreme cases it is also permissible to set below rail head where worn wheels are the cause of over greasing.

7.7.6 When the plunger height is correct, tighten the pressure pad against the adjuster screw using the M8 hex bolt on each inner face of the pump body (do not over-tighten). Tighten the M8 Lock nut against the pump body to lock it in place.
Note: On pre 2004 systems the M8 hex bolt was an M8 Allen bolt requiring a 4mm Allen Key.

7.7.7 Should further adjustments be required then the procedure should be repeated having first loosened the pressure pad screw.

Note: Prior to January 2004 the pressure pad system was not fitted. The adjusting screws include an anti-vibration feature to help maintain height setting. The screws have a thread locking patch towards the top of the thread and require that additional thread locking compound; Loctite 222 (Whitmore Rail Part No. LCS200-69) is applied to the thread before screwing into the pump body.

Similarly, should further adjustment be needed then the screw should be unwound to clear the pump body, general oil / grease contamination removed and Loctite 222 (Whitmore Rail Part No. LCS200-69) applied to the thread prior to re-fitting. New adjusting screws can be obtained, (see parts list LCS200-22).

A plunger setting gauge is available from Whitmore Rail should that be preferred (Part No. LCS104--06).

7.8 Test the Pumping System

7.8.1 Using the wood shaft of a suitable hammer or other suitable tool depress one of the plungers (not completely down) until the grease flows from the outlet pipe. **Do not strike the plunger with a hammer at any stage**. If required the Whitmore Rail pump setting tool incorporates features that restrict total plunger travel (Part No. LCS104-02).

7.8.2 Repeat for the other pump.

8 Blade Installation

8.1 Installing Standard Blade (rail clamp each end)

8.1.1 Once the position that the Blade is to be fitted to has been identified, lay the Blade unit adjacent to the rail (on the 4' side) to show the positions where the Blade clamps need to be fitted.

8.1.2 Both Blade clamps can now be fitted.

8.1.3 Locate the 50mm (2") long special hex bolts through the upper holes of the clamp with the hexagon head located in the clamp slot. The main part of the clamp is fitted on the 4' side of the rail with the thread at the top and facing away from the rail.

8.1.4 The hook bolt is fitted under the rail with the hook clasping on the foot of the rail on the field side with the threaded part inserted through the hole at the base of the clamp.

8.1.5 The washers and nut are then fitted to the hook bolt and fastened tight. Bed the clamp fully on the rail foot by striking the clamp base with a hammer (do not damage the rail foot or the clamp thread). Retighten the Nyloc nut.

8.1.6 Repeat for the second clamp.

8.2 Application Variation for Bull Head Blade Rail Clamp

8.2.1 Blade Rail clamps are different for the Bull Head Rail. Clamps consist of two sections to fit around the rail flange.

8.2.2 Locate the 50mm (2") long special hex bolts through the upper holes of the clamp with the hexagon head located in the clamp slot. The clamp is fitted on the 4' side of the rail with the thread stud at the top and facing away from the rail.

8.2.3 The rear half of the clamp is fitted on the opposite side with the M16 x 160 long bolt inserted under the rail through the hole in both clamps.

8.2.4 The washers and nut are then fitted to the hook bolt and fastened tight. Bed the clamp fully on the rail foot by striking the clamp base with a hammer (do not damage the rail foot or the clamp thread). Retighten the Nyloc nut.

8.2.5 Repeat for the second clamp.

8.3 Installing the Blades

8.3.1 Fit the Blade onto the clamps using the M16 flat washer and Nyloc nut onto each clamp and secure. Hold the Blade against the gauge face of the rail, if there is a gap between the back plate and the gauge face of the rail spacing shims will need to be fitted.

8.3.2 To fit the spacing shims loosen the two M10 bolts that fit the Blade plates to the brackets. Slip the number of shims needed behind the

plate and over the threads of the M10 bolts between the bracket and the Blade backplate.

8.3.3 Repeat for the other end of the Blade if necessary.

8.3.4 Set the Blade to the required height below the railhead using a suitable gauge / measuring device minimum distance is 18mm. The precise dimension is subject to rail profile and anticipated wheel wear, which must be carefully considered. If required a suitable gauge is available from Whitmore Rail (Part No. or LCS104-06), showing setting with QHi/Whitmore Rail gauge).

8.3.5 Repeat from 8.3.1 for the remaining blades.

8.4 Application Variation for Other Rail Types

8.4.1 The fitting process is the same for the Bull Head and UIC60 style Blades; only the Blade bracket is different.

8.5 Installing EasiBlades (single central rail clamp)

8.5.1 EasiBlades are supplied as complete single units. From the 4’ / Gage and midway between Sleepers / Ties slide the base (W bracket) over the rail foot as shown. Locate the hook bolt around the opposite side of the foot and tighten the single Nyloc nut. Fully bed the base onto the rail using a hammer on the vertical faces of the ‘W’ bracket. Retighten the Nyloc nut.

8.5.2 The blades are provided in left and right hand forms; the difference being the direction the hose tail points, the correct layout is shown in the adjacent picture, outer pairs with hose tails pointing towards each other.

8.5.3 Tilt the blade up so that the blade tip is towards the rail head and as high as possible, lightly tighten the two pivot bolts.

8.5.4 Decide the required blade height and tap the steel lugs on the blade vertically down evenly using a hammer to achieve the required height. The setting gauge described in Section 8.3.4 should be used to verify the heights.

8.5.5 There may be a slight gap between the tip of the blade and the rail. To close this gap tap the corner of the lug as necessary, **do not hammer the blade itself**.

8.5.6 It is important that the lugs are a tight fit over the vertical face of the rail clamp. If there is any clearance before tightening then insert suitable M16 washers between the two items to reduce clearance.

8.5.7 Repeat process for each EasiBlade.

8.6 Installing Check Rail Blades

The procedure is similar to a standard Blade installation on the high rail. Confirm that the check rail blades are fitted only to the check rail. Note: Rails can take several forms including bull Head, Flat bottom and U69 / UIC33. After completing this Section proceed from Section **9** as filling and priming principals are the same for Check Rail blades and Blades.

Bull Head Check Rail

Flat Bottom Check / Restraining Rail

U69 / UIC33 Check / Restraining Rail

8.6.1 Fit the rail clamps to the Check Rail generally following procedures outlined in Sections 8, reference**Error! Reference source not found.** for Bull Head rail, Flat Bottom Check / Restraining Rail, U69 / UIC33 Check / Restraining Rail. Blade fixing studs on the clamps should be oriented towards the 4', clamp spacing to suit check rail blades and the full assembly located midway between sleepers.

8.6.2 When fitting TOR rails with insufficient clearance between the foot of the running rail and foot of the check rail then a rail clamp is fitted to each rail and long stud in between passing under the two rails. The check blade must be located at the check block to avoid over stressing the between the rail fastener.

8.6.3 Locate the Check Rail assembly on the two rail clamp studs and tighten the two M16 fasteners securely.

8.6.4 The blade has vertical and horizontal adjustment through setting of the M16 fastenings on the support bracket. Arrange the blade so that the exit ports are between 1 and 2mm from the Check Rail face and the blade is horizontal, lock securely in that position.

9 Final Setting

9.1 Fitting the Delivery Hoses

9.1.1 Fit one end of a delivery hose to the hose tail inlet on the Blade with a hose clip and measure the other end of the hose to the grease outlet tail of the pump body, cut the hose and secure it with a hose clip. Ensure that the hose runs under the rails.

9.1.2 Repeat the procedure for the other hose.

9.2 Fill the Hoses and Blades

9.2.1 Using the wood shaft of a suitable hammer keep depressing one of the plungers until grease appears at the Blade. Do not fully depress plunger, maintain a minimum 1mm clearance with pump body.

9.2.2 Repeat for the other Blade.

Alternative

The operation can be made more efficient by using the Blade priming kit available from Whitmore Europe (Part No. LCS102-08).

- Prior to filling the delivery hose to the pump body outlet.
- Insert the filler connector into the free end of the delivery hose and clamp with the provided hose clip.
- Connect the reservoir hand pump and operate until grease starts to exit the Blade ports.
- Remove the priming kit from the hose.
- Connect the hose to the pump body outlet.
- Repeat for the second Blade.
- Revert to Section 9.2 for final priming.

9.3 Fit the Pump Guard

9.3.1 Place the tamper bar over the two studs that are on the pump clamps.

9.3.2 Fit the washers and nuts and tighten.

10 Routine Maintenance

Prior to any maintenance it is necessary to have the following data.

- The date that the lubricator was last maintained.
- The final depth of the reservoir piston when the lubricator was last maintained.
- The plunger heights when the lubricator was last maintained.
- Any works that were carried out when the lubricator was last maintained that could change the grease output.
- Any work that was identified but not carried out on the previous visit.

10.1 Measuring the Reservoir

10.1.1 This measurement is the only true guide which indicates how much grease the lubricator has used since it was last visited. It is necessary to have the previous recordings of the last inspection since it will enable you to make judgements and carry out corrective action if needed without any guesswork.

10.1.2 Using a ruler, insert it into the centre hole in the front cover of the reservoir (see side image), making sure that the side of the ruler is touching against the side of the hole and the ruler is at the same angle that the reservoir is at.

10.1.3 When the ruler stops at the rear most face of the piston, check exactly the measurement (in millimetres) against the face of the rear cover at the centre hole.

10.1.4 Record this measurement and compare it to the data that you have brought to site.

Important Note: Do not overfill the reservoir

Flat Back Plate (older reservoirs)		**Top Hat Back Plate (newer reservoirs)**	
Full	**80mm**	**Full**	**80mm**
Empty	**225mm**	**Empty**	**280mm**

10.1.5 By subtracting the final measurement recorded from the last time the lubricator was maintained from the measurement you have recorded this time will give you the amount of grease used in millimetres.

10.1.6 The type of lubricator, its installation and rail traffic will determine the volume of grease used since the lubricator was last maintained. For 1mm of piston displacement equates to 0.12kg of grease associated to Whitmore Europe's reservoir (Part No. LCS102-01).

10.1.7 However do not make any alterations at this stage, as other reasons for incorrect grease outputs may be the cause.

10.2 Checking for Leaks

10.2.1 The lubricator should be checked for leaks. In case there are leaks, it will be necessary to take the leak into consideration in regards to the grease output that you have noted.

10.2.2 Leaks on the primary side (i.e. feed hoses or inlet assembly) of the lubricator will cause an increase in grease output that is not due to the settings of the lubricator.

10.2.3 Tighten any hose clips or nuts / bolts / screws that might be causing the leak and / or replace the faulty part that is causing the leak.

10.3 Cleaning the Lubricator and Surrounding Site

10.3.1 At this stage the lubricator must be cleaned. The reasons are that when the checks are made, you will be able to note measurements and assess the operations of the lubricator accurately and carry out the works in a cleaner environment. The reason why the lubricator must not be cleaned before this stage, is that once it is clean, you will have removed evidence of the leak.

10.3.2 The whole lubricator must be cleaned thoroughly.

10.3.3 The site must be cleared of excess grease.

10.3.4 If oil absorbent granules are being used, the existing, soiled granules should be removed and replaced with fresh granules. This must be done with extreme caution, if the granules are allowed to get into the lubricator system via the filling valve, the system may become blocked or worse the non-return valve can be held open.

10.3.5 The surrounding rail chairs and clips, all rails in the immediate vicinity and the insulator pots need to be cleaned. The 3rd and 4th rail are required to be cleaned to ensure they are free of grease and dirt, this is to avoid causing a fire risk and hazardous under footing. **Do not attempt to clean live traction current rails with the current switched on.**

10.4 Measuring the Plunger Heights

10.4.1 This section is for the initial measurements of the plunger heights. There are two measurements to be recorded, one for the running on and one for the running off. The running on and running off are identified by the direction of traffic, the running on being the first plunger that the train wheels will strike, and the running off being the second plunger that the train wheels will strike. The height to be measured is the distance between the top of the plunger head and the top of the crown of the rail.

10.4.2 The plunger heights must be measured and recorded. The plunger heights must be measured to the nearest 0.25 of a millimetre.

10.4.3 If the lubricator has not used the amount of grease that is required for this lubricator since the last time that it was maintained, check the following:

- Check that the plunger heights are the same as when the lubricator was last maintained.
- You may find that the plunger heights have changed due to loose bolts on the pump unit bracket causing it to move, check the bolts and tighten if necessary. If necessary reset the plunger heights once all the remaining checks have been carried out.

  Note: The adjusting screws are designed for use and adjustment during initial installation only, the adjusting screws include an anti-vibration feature to maintain the setting. Should further adjustment be needed then the screw should be unwound to clear the pump body, oil / grease contamination removed and Loctite 222 applied to the thread prior to re-fitting. Alternatively new adjusting screws can be obtained, (see parts list LCS200-22).

- If the plunger heights are lower than previously set but the bolts are all tight, check that the plungers have not become flat, if so change them. Also the plungers may be stuck down due to defective springs, this will be detected by the plunger operation test later in this Manual.

- If the plunger heights have been reset on this visit record the new heights.

Note If the plungers are being raised, they should only be raised by 0.25mm at a time and must be inspected on the following shift. However, if the plunger heights are known to have dropped they may be reset to their original height. A follow up inspection must still be made on the following shift. Plunger height should be adjusted up (to increase) or down (to decrease), grease output to suit local traffic / wheel pattern.

10.5 Checking for Airlocks

10.5.1 The following steps should be followed to check for airlocks:

- Remove the delivery hose from the pump outlet.
- Using the wooden shaft of a suitable hammer, depress one of the plungers downwards several times.
- If the plunger has no resistance, and / or there is no grease flow, the pumps are probably air locked.
- Record the results.
- If the test was not satisfactory, clear the air lock. The easiest method is by loosening the air bleed screw until the groove on the threaded section is exposed. Using the wooden shaft of a suitable hammer, depress the plungers downwards several times; do not exceed the permissible plunger travel.
- Record the results.
- If the attempt to clear the airlock was not satisfactory check that there is a grease flow from the reservoir.
- Repeat the sequence for the remaining plunger.

Air locks that are present once servicing is done at the lubricator will give you certain information into why the lubricator has not had a sufficient grease output.

If the lubricator has not used any or enough grease required for that particular lubricator but air locks are present, plungers must not be raised, as due to the air locks, the lubricator would have not been working.

If the lubricator has not used any grease, but no air locks are present other corrective actions should be undertaken.

10.6 Checking for Defective Plungers and Plunger Springs

10.6.1 The operation test of this section should be made into two parts:

- Firstly, by using the pump pliers, grip the plunger and move the plunger up and down to ensure that there is no free movement of the plunger or plunger return spring.
- The second test is using the wooden shaft of a suitable hammer, depress the plungers, ensure that the return of the plunger is not too slow and in addition check the plunger is returning fully after every depression of the plunger. **Do not fully depress plunger to avoid damage**.
- Record the results of the test.

- If the test is not satisfactory then the plunger and / or plunger return springs should be changed.

10.7 Checking for a Defective Outlet Non-return Valve

10.7.1 If the grease is flowing onto the spreader bar or out of the pump body outlet ports, when the delivery hoses are removed, without the plungers being struck, the non-return valve may be defective.

10.7.2 If the non-return valve is found to be defective, the valve cannot be repaired and a new valve is not available; the lubricator must be temporarily locked off, if this is not done, **excessive grease will migrate onto the head of the rail**.

10.8 Inspection of the Blades

10.8.1 Visually check the Blades for damage and / or wear.

10.8.2 Check that the fastenings are secure.

10.8.3 Depress the plungers, (several times for each plunger), using the wood shaft of a suitable hammer ensure all of the ports on the top face of the spreader bar are dispersing grease. This will show if there is hardened grease, inside the Blade and/or if the Blade slots are blocked. **Do not fully depress the plunger to avoid damage.**

10.8.4 Record your findings and any works carried out.

10.9 Filling the Reservoir

10.9.1 Ensure that the non-return filling valve is clean, place the filling pump nozzle over the non-return filling valve on the reservoir and pump the handle.

10.9.2 Do not fill the reservoir to more than 80mm.

10.9.3 Record the final reservoir measurements.

10.10 Periodic Replacement of Components

IMPORTANT

Maintenance and repair of the lubricator and reservoir should only be carried out by trained personnel. Compressed springs inside the lubricator may be dangerous if handled incorrectly.

10.10.1 It is recommended that various system items are replaced periodically, exchange will be dependent on traffic frequency and should be monitored during maintenance visits but as a minimum should include the following.

10.10.2 Replacement should be undertaken by technicians trained and experienced in the product. Item replacement is generally straightforward but care should be taken to relieve the pressure within the system before removing any item.

WARNING

The reservoir is fitted with a large compression spring and the reservoir must not be disassembled without the spider locking bar being in place. Take extra care when handling the compressed spring as stored energy can be very dangerous.

10.10.3 A particular example of this is dismantling of the reservoir, the main spring exerts significant force on the reservoir back plate. Before dismantling of any part of the reservoir the following process should be followed:

- Insert the spider through the rear reservoir plate and securely attach the threaded boss within the piston (ref diagram in following pages). Lock the spider handle against the reservoir back plate.
- Remove the reservoir hose and allow any grease to be transferred to a suitable container by slowly unwinding the spider handle.
- With the reservoir empty and the spider still in place and locked the rear reservoir securing bolts can be removed. Slowly unwind the spider locking handle from against the back plate until all spring pressure is removed.

DO NOT ATTEMPT THIS PROCESS WITH GREASE IN THE RESERVOIR.

- It is recommended that operatives stand to the side of the reservoir during the dismantling process.

	Exchange Frequency
Pump	
Springs	2 years
Plungers	2 years
Fasteners	5 years
Hose	
Blade and Reservoir Hose	2years
Reservoir	
Seals	5 years
Springs	5 years
Filler Valves	5 years

10.11 Maintenance Log Sheet Example

Whitmore Rail Mechanical Lubricator Maintenance Log Sheet

Maintained By	Maintainers Name	Maintain Date	Lubricator No.	
			Mileage	
Lub' Manufacturer	Whitmore Rail		ELR	
Pump Model		Serial	Road	Up / Down
			Rail Type	
Reservoir Model		GDU / Blade Model	GDU / Blade Config	2 - 4
Special Product Notes				

1. Reservoir Capacity	37kg	Initial mm (80mm Full)	Final mm (280mm Empty)
	9kg	Initial mm (50mm Full)	Final mm (205mm Empty)

2. Grease Integrity / Leakage			
2.1 Plunger Running-on	Yes / No	2.4 Reservoir piston	Yes / No
2.2 Plunger Running-off	Yes / No	2.5 Pump body inlet pipe	Yes / No
2.3 Hoses	Yes / No	2.6 Pump body outlet ports	Yes / No
		2.7 GDU's	Yes / No

	LH Rail / Running-on	RH Rail / Running-off
3. Initial plunger height.	Initial Height	Final Height

4. GDU plate height.	1	2	3	4
Initial				
Final				

5. Grease Flow Test		
5.1 Airlocks Hammer test	PASS / FAIL	PASS / FAIL
If above test failed, cleared airlock	YES / NO	YES / NO
Continuous grease flow	PASS / FAIL	PASS / FAIL

6. Pump Operation Test	PASS / FAIL	PASS / FAIL
6.1 Replaced spring	YES / NO	YES / NO
6.2 Replaced plungers	YES / NO	YES / NO
6.3 Replaced non-return valve	YES / NO	YES / NO
6.4 Replaced pump body	YES / NO	YES / NO

7. GDU		
7.1 Visual check	PASS / FAIL	PASS / FAIL
7.2 Pumped through GDUs	YES / NO	YES / NO
7.3 Removed & cleaned plates	YES / NO	YES / NO
7.4 Fitted new plates	YES / NO	YES / NO

8. Grease distribution through curve		
8.1 Over rail head	YES / NO	
8.2 If yes, number of sleepers		
8.3 Grease distribution	¼ - ½ - ¾ - Full Curve	PASS / FAIL
8.4 Total Miles Covered	Miles	
If any part of section 10 has failed what action, if necessary, was taken		

9. Lubricator fastenings check	YES / NO

WORK / GENERAL	Enviromental/Waste		Spares Required
	Any waste including packing and empty grease tubs handed over to Client for appropriate disposal		

Post Install site accepted by:					
Customer		Name		Date	

11 Parts List

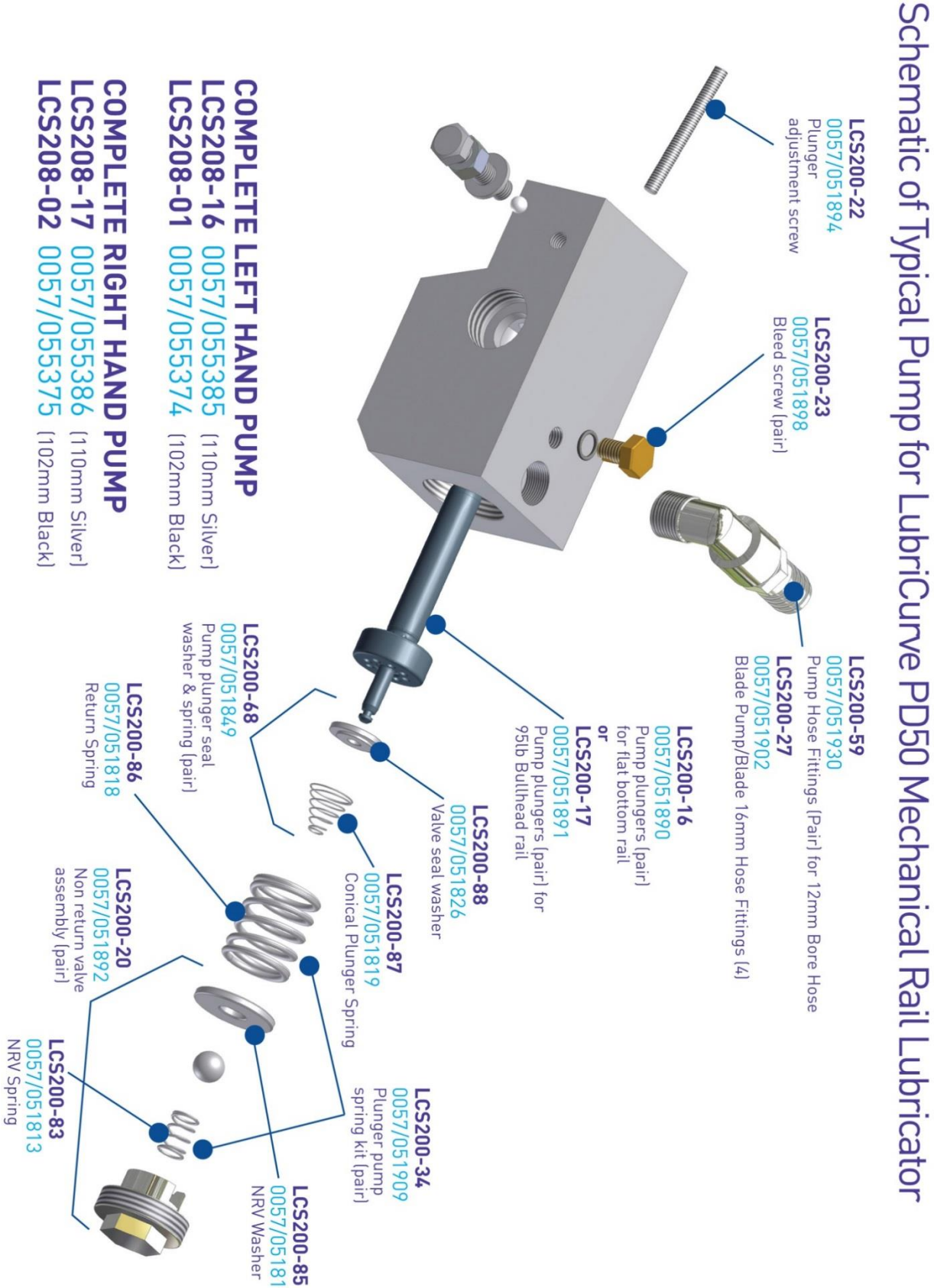
Contact Whitmore Europe for advice / availability

12 Basic Installation Tool Kit

A selection of hand tools are suggested to correctly fit and maintain the pumps, specific recommended Whitmore products are referenced above.

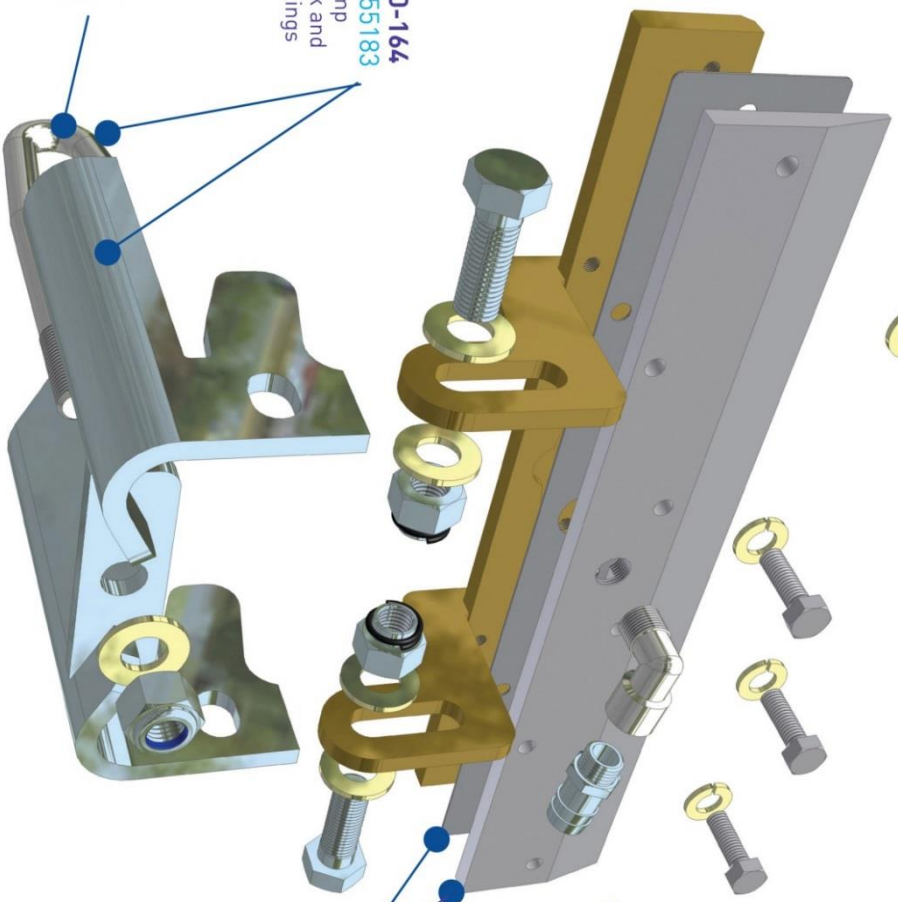
T Handled 2.5mm Allen Key
Ratchet Handle 1/2" Drive
Combination Spanner 24mm
Combination Spanner 20mm
Combination Spanner 19mm
Combination Spanner 17mm
Combination Spanner 13mm
Combination Spanner $1^{5}/_{16}$"
Socket 7mm 3/8" drive
Socket 13mm 1/2" drive
Socket 17mm 1/2" drive
Socket 19mm 1/2" drive
Socket 24mm 1/2" drive
Socket Long Reach 24mm 1/2" drive
Ball Pein 1lb Hammer
Junior Hacksaw and Blades
Screwdriver 6" x 1/4" flat blade, flared tip
Folding Rule (wood or plastic)
Tool Bag

13 Exploded Views of System Elements



Schematic of EasiBlade for rail 113, UIC54, UIC56, UIC60

LCS200-90
0057/051987
Pair of blades for 16mm bore hose
or
LCS200-96
0057/051989
Pair of blades for
12mm bore hose



LCS200-164
0057/055183
Rail clamp
c/w hook and
blade fixings

LCS200-133
0057/055245
Hook Bolt

LCS200-45
0057/051916
Blade bolt/
Washer
fastener kit

LCS200-80
0057/051948
Pair of aluminium front
plates and membranes
15mm Ports

LCS200-152
0057/055248
Pair of aluminium front
plates and membranes
10mm Ports

LCS200-124
0057/055244
Pair of steel front
plates and membranes
15mm Ports

LCS200-151
0057/055247
Pair of steel front
plates and membranes
10mm Ports

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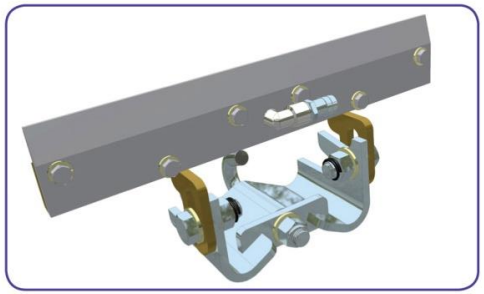
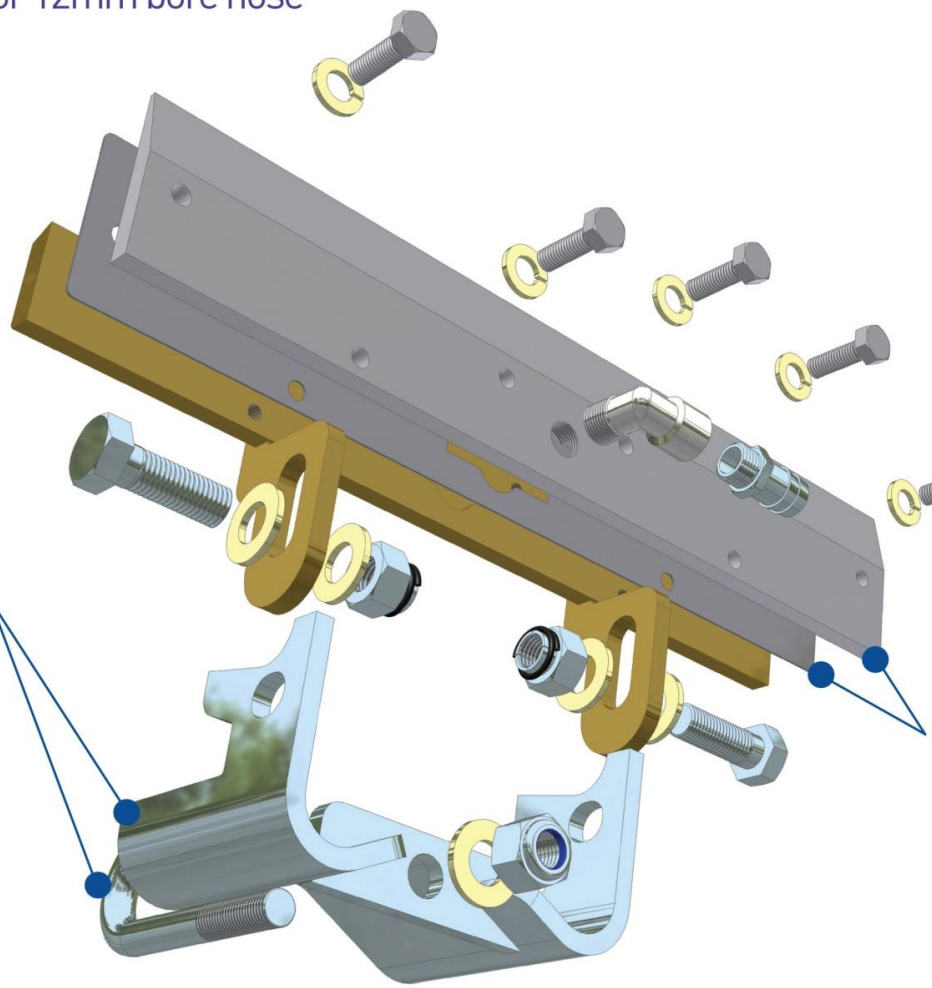
Schematic of Easi-blade for 95lb Bullhead Rail

LCS200-89 0057/051986
Pair of blades for 16mm bore hose
LCS200-95 0057/051988
Pair of blades for 12mm bore hose





LCS200-172
Rail clamp
c/w hook and
blade fixings

LCS200-45
0057/051916
Blade bolt/
washer fastener kit

LCS200-80
0057/051948
Pair of aluminium front
plates and membranes
15mm Ports

LCS200-124
0057/055244
Pair of steel front
plates and membranes
15mm Ports

LCS200-152
0057/055248
Pair of aluminium front
plates and membranes
10mm Ports

LCS200-151
0057/055247
Pair of steel front
plates and membranes
10mm Ports

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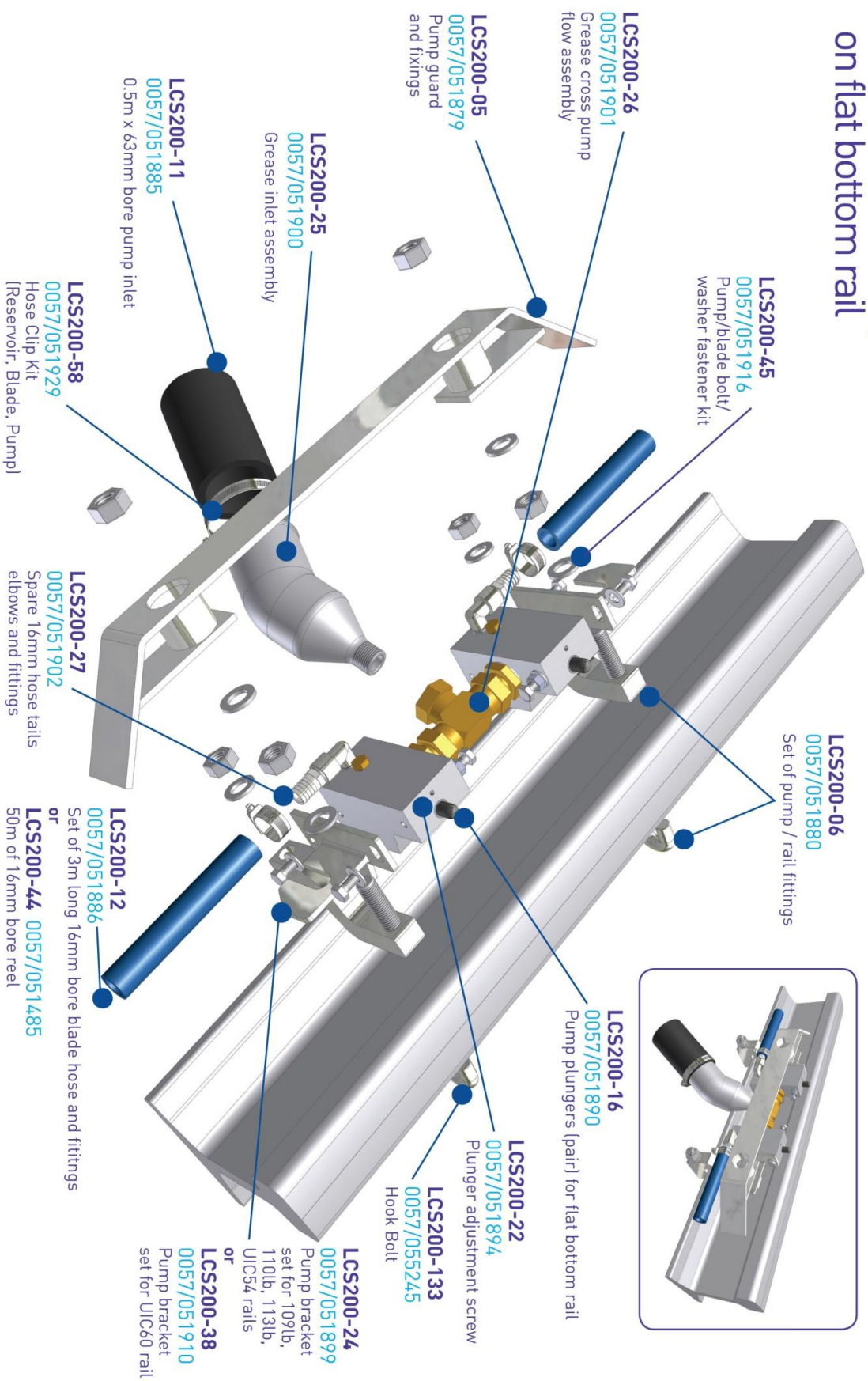
Schematic of Pump for QHi LubriCurve PD50 mechanical rail lubricator on flat bottom rail



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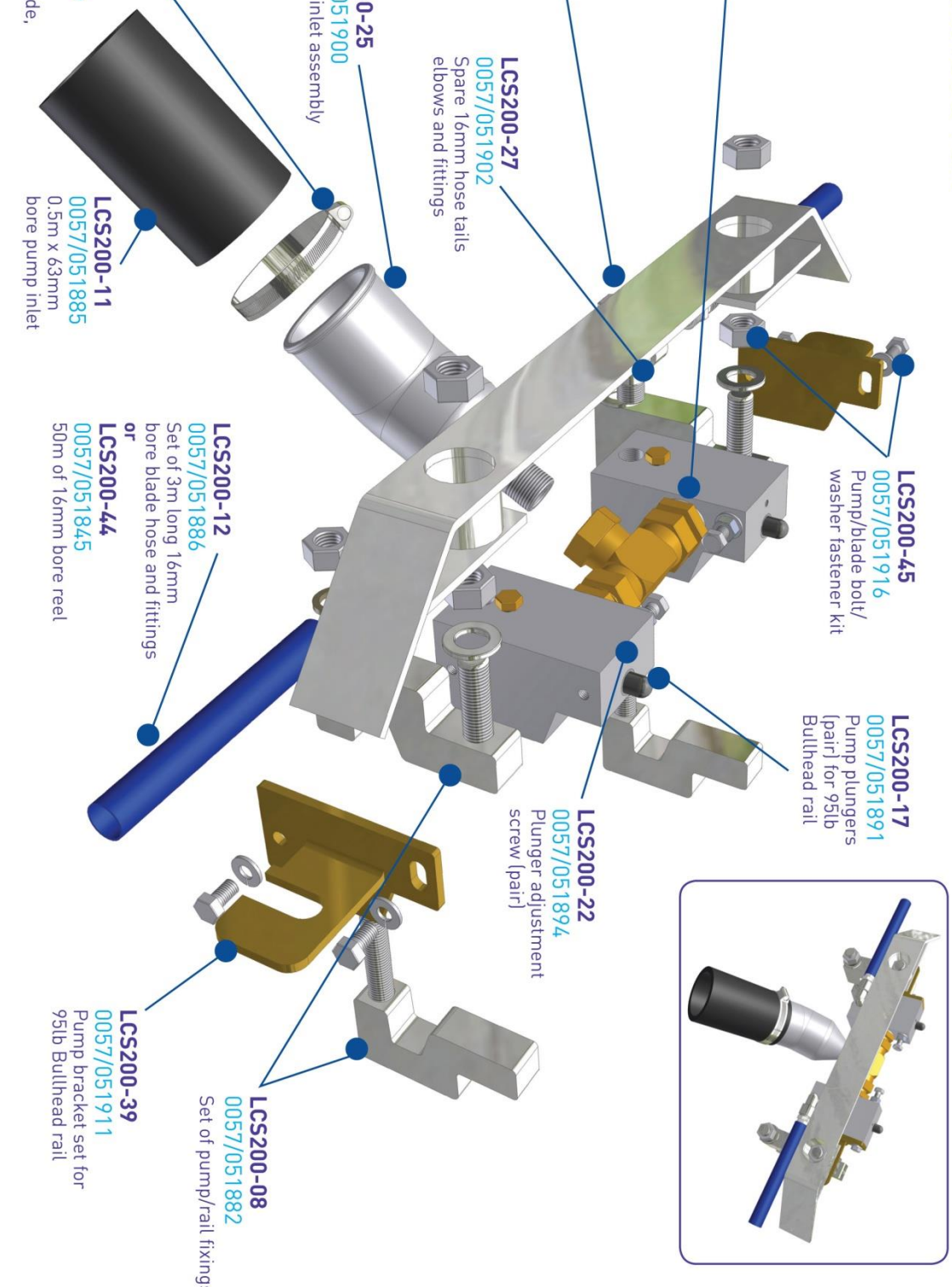
Schematic of Pump for QHi Lubricurve PD50 mechanical rail lubricator for 95lb Bullhead rail



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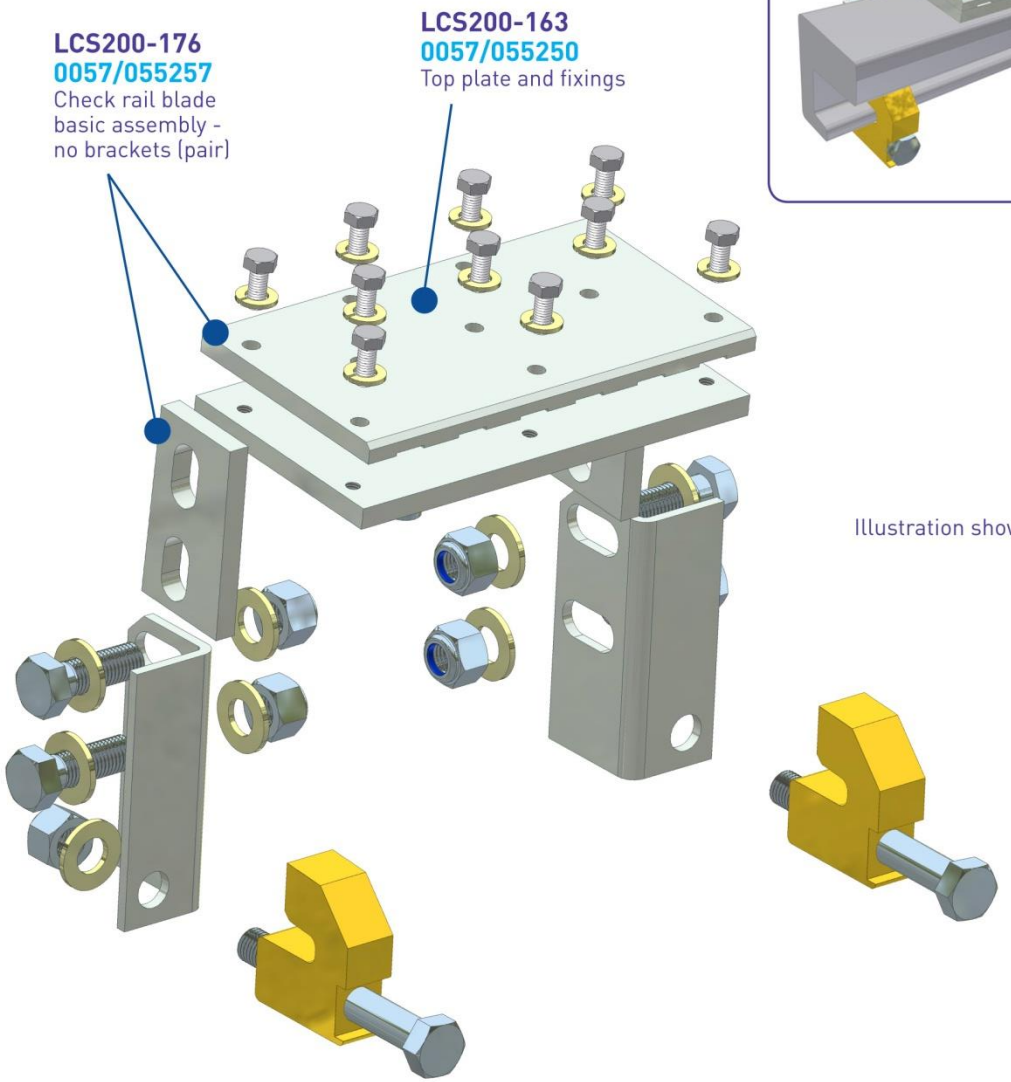
Schematic of QHi EasiCheck rail blades (Pair)

LCS200-11 0057/051887
Flat bottom running rail / bull head check rail

LCS200-14 0057/051888
Bull head running rail / bull head check rail

LCS200-53 0057/051924
Flat bottom running rail / UIC33 check rail

LCS200-61 0057/051285
Flat bottom running rail / flat bottom check rail



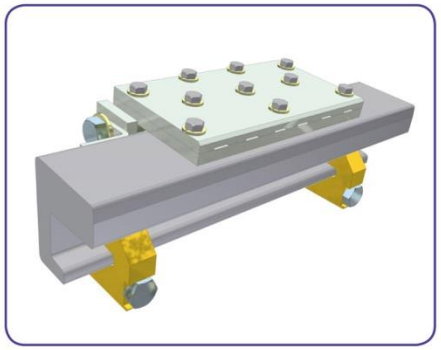


Illustration shows UIC33 option

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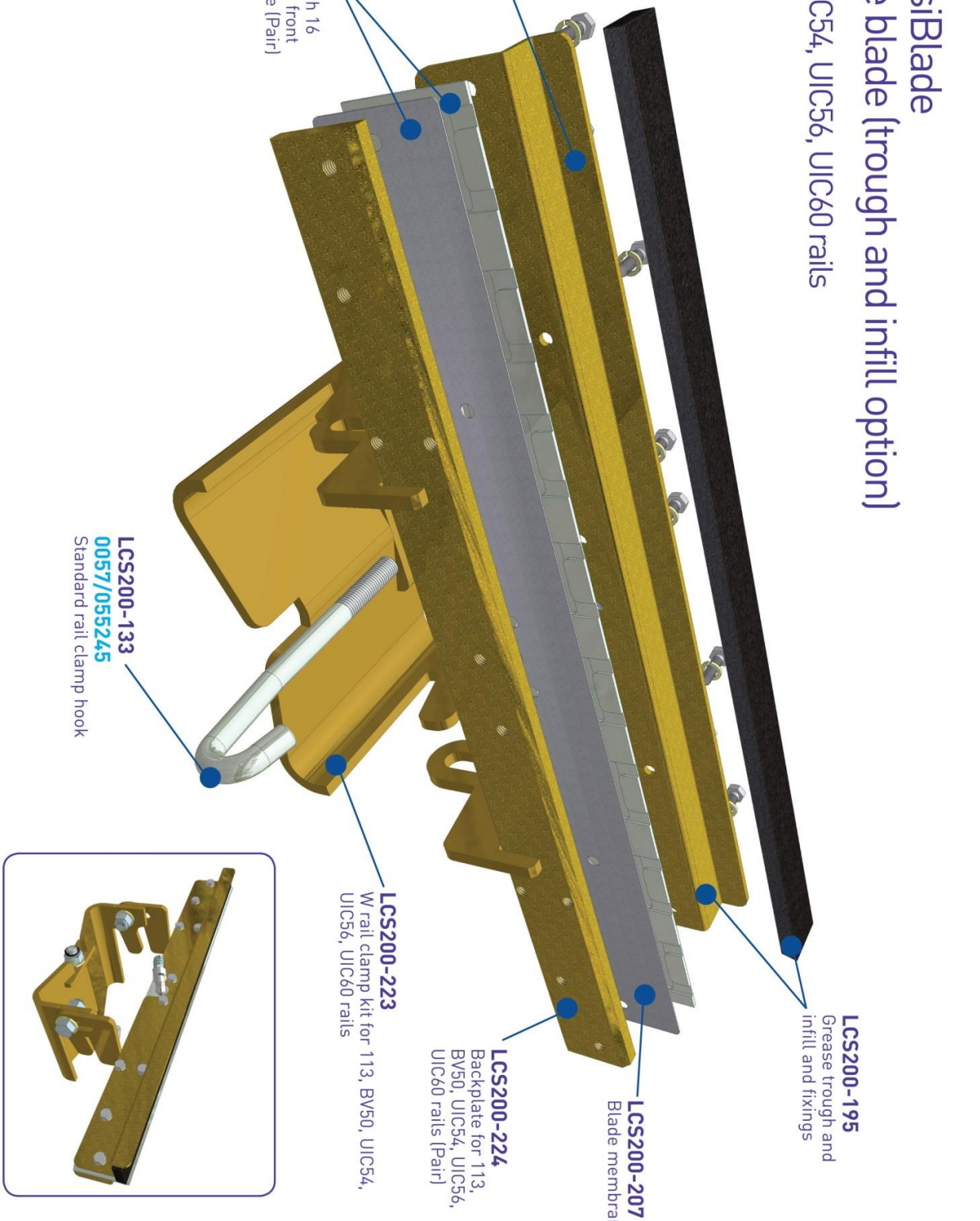
60cm EasiBlade
Complete blade (trough and infill option)

Suits 113, UIC54, UIC56, UIC60 rails

LCS200-206
16mm hose

LCS200-218
12mm hose



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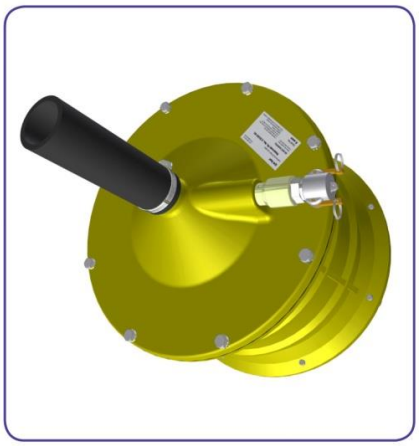
Schematic of QHi Lubricurve PD50 mechanical reservoir

LCS102-01 0057/051811



LCS102-26
0057/055232
High Flow
Non Return Valve

LCS102-10
0057/051816
Reservoir Snaplock Cap

LCS200-11
0057/051885
0.5m x 63mm Bore pump
inlet hose & fittings

LCS200-58
0057/051929
Hose Clip

LCS200-74
0057/051720
Reservoir filler plate

LCS200-32
0057/051907
Reservoir seal kit

LCS200-71
0057/051287
Reservoir single spring set

LCS200-73
0057/051719
Reservoir top hat
spring plate

LCS102-04
0057/051815
Reservoir spider/
piston retainer

LCS200-33
0057/051908
Reservoir fastener kit

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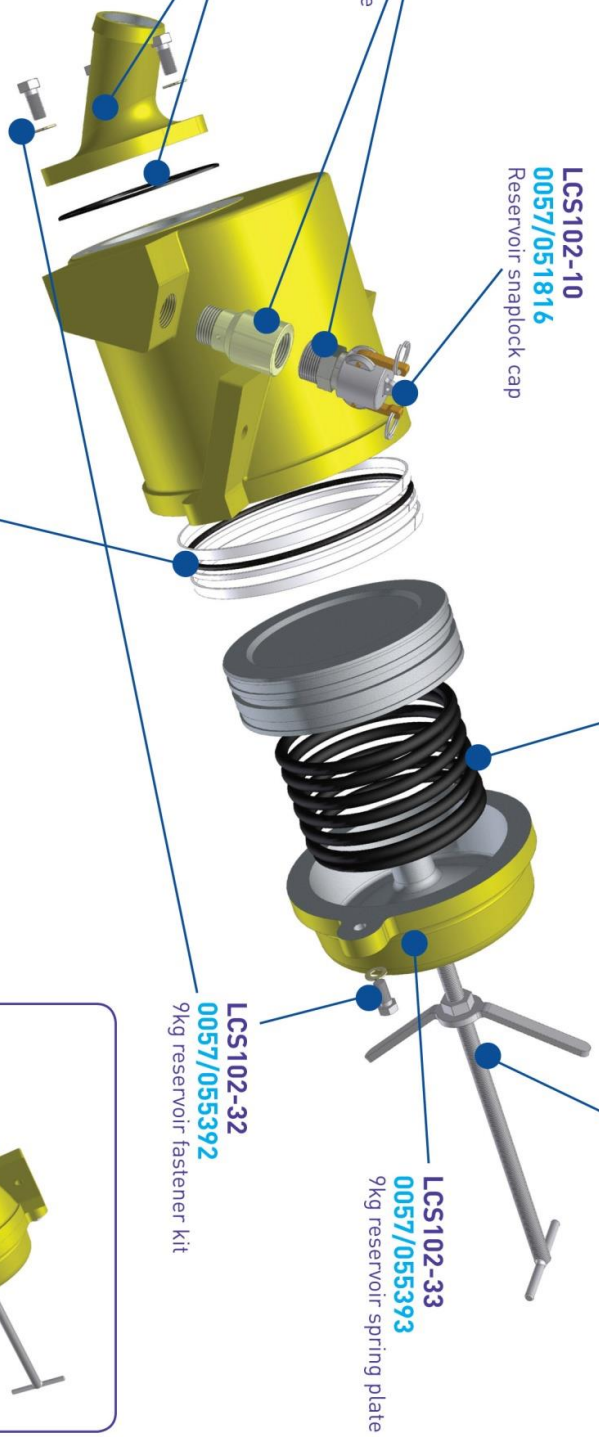
Schematic of 9kg reservoir with 63mm angled output hose

LCS102-27 0057/055389

LCS102-37 0057/055397
Kit includes a 63mm to 25mm pump inlet hose and fittings



LCS102-10
0057/051816
Reservoir snaplock cap

LCS102-26
0057/055232
High flow non-return valve

LCS102-34
0057/055394
Angled front plate suits 63mm hose

LCS102-35
0057/055395
Horizontal front plate suits 63mm hose

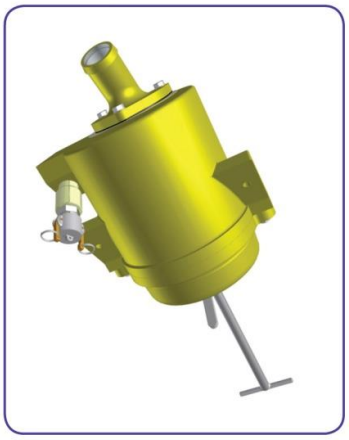
LCS102-36
0057/055396
9kg reservoir spring

LCS102-04
0057/051815
Reservoir spider

LCS102-33
0057/055393
9kg reservoir spring plate

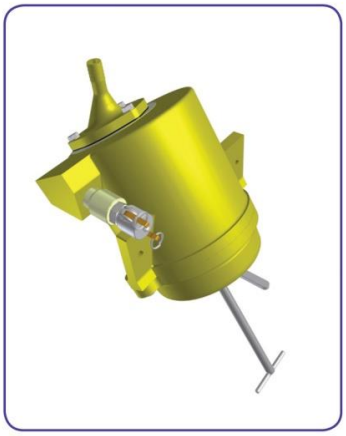
LCS102-32
0057/055392
9kg reservoir fastener kit

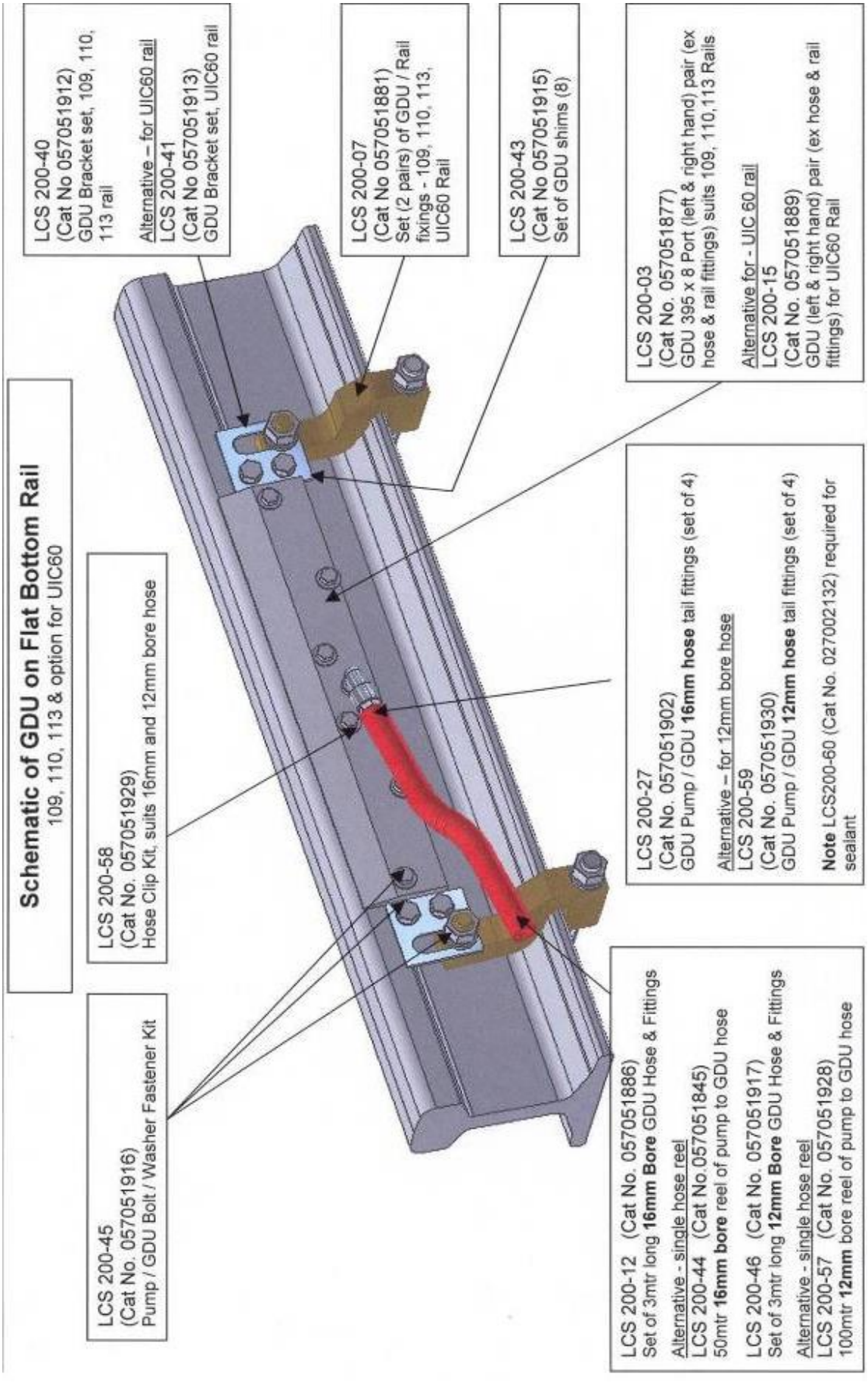
LCS102-31
0057/055391
9kg reservoir seal kit



Schematic of 9kg reservoir with 25mm output hose

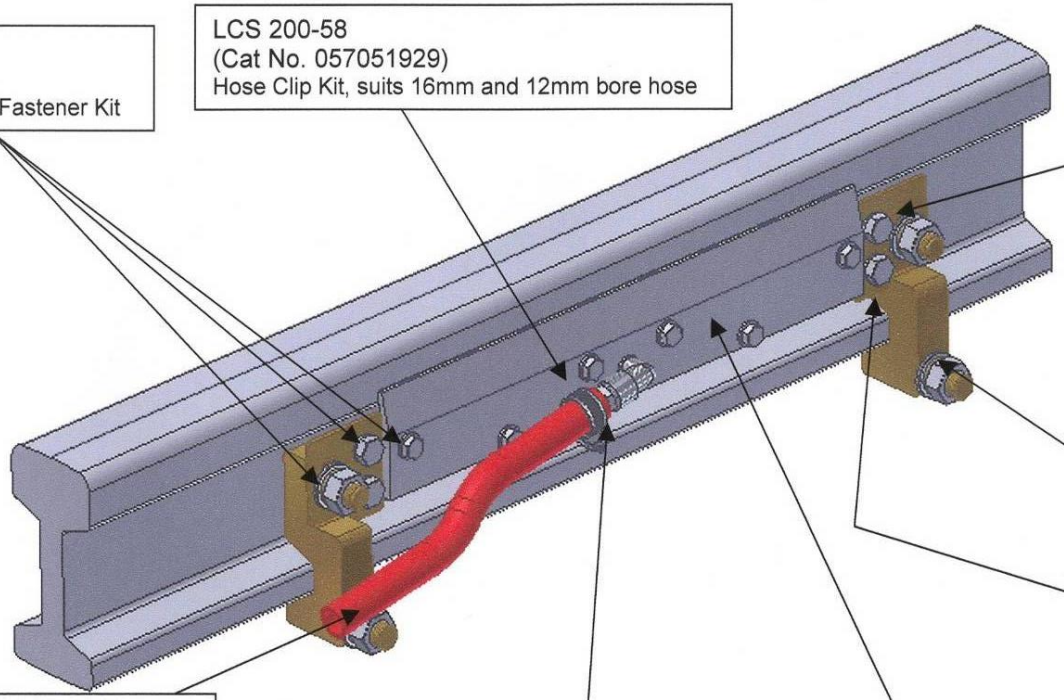
LCS102-30 0057/055390




Schematic of GDU on Flat Bottom Rail
109, 110, 113 & option for UIC60
LCS 200-40
(Cat No 057051912)
GDU Bracket set, 109, 110, 113 rail
Alternative – for UIC60 rail
LCS 200-41
(Cat No 057051913)
GDU Bracket set, UIC60 rail
LCS 200-07
(Cat No 057051881)
Set (2 pairs) of GDU / Rail fixings - 109, 110, 113, UIC60 Rail
LCS 200-43
(Cat No 057051915)
Set of GDU shims (8)
LCS 200-03
(Cat No. 057051877)
GDU 395 x 8 Port (left & right hand) pair (ex hose & rail fittings) suits 109, 110,113 Rails
Alternative for - UIC 60 rail
LCS 200-15
(Cat No. 057051889)
GDU (left & right hand) pair (ex hose & rail fittings) for UIC60 Rail
LCS 200-58
(Cat No. 057051929)
Hose Clip Kit, suits 16mm and 12mm bore hose
LCS 200-27
(Cat No. 057051902)
GDU Pump / GDU 16mm hose tail fittings (set of 4)
Alternative – for 12mm bore hose
LCS 200-59
(Cat No. 057051930)
GDU Pump / GDU 12mm hose tail fittings (set of 4)
Note LCS200-60 (Cat No. 027002132) required for sealant
LCS 200-45
(Cat No. 057051916)
Pump / GDU Bolt / Washer Fastener Kit
LCS 200-12 (Cat No. 057051886)
Set of 3mtr long 16mm Bore GDU Hose & Fittings
Alternative - single hose reel
LCS 200-44 (Cat No.057051845)
50mtr 16mm bore reel of pump to GDU hose
LCS 200-46 (Cat No. 057051917)
Set of 3mtr long 12mm Bore GDU Hose & Fittings
Alternative - single hose reel
LCS 200-57 (Cat No. 057051928)
100mtr 12mm bore reel of pump to GDU hose

Schematic of GDU on Bull Head Rail

95lb



LCS 200-45
(Cat No. 057051916)
Pump / GDU Bolt / Washer Fastener Kit

LCS 200-58
(Cat No. 057051929)
Hose Clip Kit, suits 16mm and 12mm bore hose

LCS 200-42
(Cat No 057051914)
GDU Bracket set, 95lb Bull Head rail

LCS 200-09
(Cat No 057051883)
Set (2 pairs) of GDU / Rail fixings - 95lb Bull Head Rail

LCS 200-43
(Cat No 057051915)
Set of GDU shims (8)

LCS 200-12 (Cat No. 057051886)
Set of 3mtr long **16mm Bore** GDU Hose & Fittings

Alternative - single hose reel
LCS 200-44 (Cat No.057051845)
50mtr **16mm bore** reel of pump to GDU hose

LCS 200-46 (Cat No. 057051917)
Set of 3mtr long **12mm Bore** GDU Hose & Fittings

Alternative - single hose reel
LCS 200-57 (Cat No. 057051928)
100mtr **12mm** bore reel of pump to GDU hose

LCS 200-27
(Cat No. 057051902)
GDU Pump / GDU **16mm hose** tail fittings (set of 4)

Alternative – for 12mm bore hose
LCS 200-59
(Cat No. 057051930)
GDU Pump / GDU **12mm hose** tail fittings (set of 4)

Note LCS200-60 (Cat No. 027002132) required for sealant

LCS 200-04
(Cat No. 057051878)
GDU 395 x 8 Port (left & right hand) pair (ex hose & rail fittings) for 95lb Bull Head Rail

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WHITMORE Europe

EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

We Whitmore Europe Limited

of City Park
Watchmead
Welwyn Garden City
Hertfordshire AL7 1LT

in accordance with the following Directive(s):
2006/42/EC The Machinery Directive

Hereby declare that:
Equipment LubriCurve, Track Mounted, Mechanical, Rail & Wheel Flange Lubricator System and accessories.

Model number LCS101, 100, 102, 112, 200, 208, 209 Series Lubricators

is in conformity with the applicable requirements of the following documents

Ref. No.	Title	Edition/date
ISO 9001	Quality Management System Requirements	2008
ISO14001	Environmental Management System	2004

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications and is in accordance with the requirements of the Directive providing the Lubricator has been installed in accordance with Whitmore Europe's Installation & Maintenance Manual

Signed by:

Name: Craig Foster

Position: Managing Director

Whitmore Europe Ltd., Welwyn Garden City AL7 1LT

On 05th February 2017

The technical documentation for the machinery is available from:
Name: Operations Director
Address: Whitmore Europe Ltd., Welwyn Garden City AL7 1LT

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