

**INSTALLATION, OPERATING & MAINTENANCE
MANUAL**

FOR

710 ELECTRIC MOTOR CONTROL SAMPLE PROBE

“710 EL MC”

This Jiskoot Product is designed to provide outstanding service if correctly installed, used and maintained recognising the effects of the process conditions (temperature, pressure, wax/pour point, sediment, etc.).

Truly representative sampling of crude oils etc., cannot be achieved by one single product in isolation. A well designed system and operating procedures as laid down in the Sampling Standards ISO 3171, API 8.2 and IP Chapter VI section 2 are mandatory.

Please consult Jiskoot for further information and assistance.

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1 Warranty

This product should be supplied with a warranty card. Please complete and return it to register for warranty support.

In the event it is missing, to register for support, please contact us on +44 (0)1892 518000 or support@jiskoot.com, quoting the Jiskoot Order Number or Serial No with the following information:

- Date installed
- Full installation site details, including contact details
- Maintenance and operator contact details (where different from above)
- Product comments/feedback

If the product has been supplied as part of a Jiskoot system or assembly, please complete the warranty card for the system.

2 Introduction



Figure 1- Series 710 Mk II EL MC Sample Probe .

The 710 Electric Sample Probe provides a means of extracting a sample from liquids flowing in a pipeline. Designed for applications where compressed air is unsuitable or unavailable, the 710 Sample Probe is installed directly into the main pipeline.

The 710 Sample Probe is designed to extract nominal 1cc samples from products ranging from Natural Gas Liquid at 0°C to refined and crude oil at up to 90°C, operating in a pressure range from 3 to 50 Barg, on viscosities 0.5 to 500cSt. The Sample Probe can operate in an ambient temperature range of -20°C to 40°C and has an Ingress Protection rating of IP55 (BS EN 60529: 1992).

The standard 710 Sample Probe is designed for installation through a 2" 150# or 2" 300# raised face flanged tapping in the pipeline and can withstand static pressure testing to full flange rating of 76 Barg. Other flange sizes may be available to special order.

The Sample Probe is supplied with a 3 phase motor, for use in a hazardous area, certified to either ATEX Zone 1, Gas Group IIB, T4 or UL/FM Class 1, Division 1, Gas Groups 2, 3 & 4. Voltage/frequency as specified at order placement. Where only single-phase supplies are available, an inverter can be supplied to generate the 3 phase supply.

Note: *When requesting assistance or spare parts, please provide the Sample Probe Model and Serial Numbers to ensure that the correct options are noted.*

3 Operating Instructions

The Sample Probe must be installed in accordance with the Installation Details, and be connected to a suitable sample receptacle.

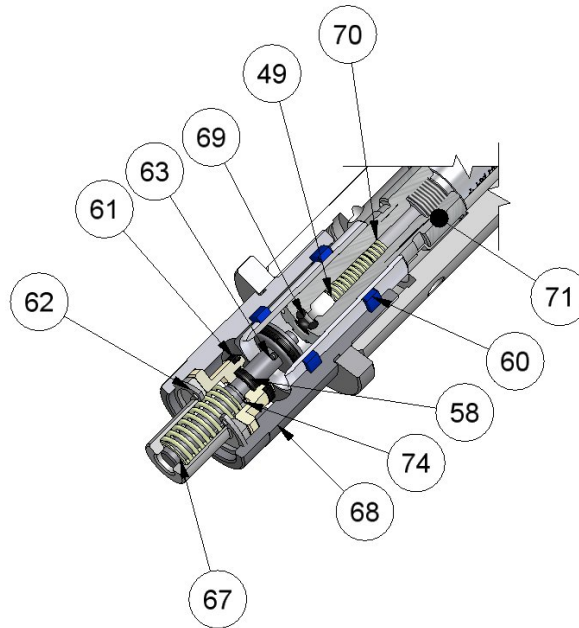
A suitable Sample Receiver must be connected to the Sample outlet.

The sample probe requires continuous power to the 3-phase motor via the MCU (Motor Control Unit, See Data Sheet S137-0706-2 and Handbook 710 Motor Control Unit (MCU), together with a signal, indicating sample at the required intervals. Any pipeline conditioning facility must be active to ensure a representative product is available to the Sample Probe.

Control of the Sample Probe, including changeover of Sample Receivers will be determined by the type of Sampler Control System being used.

4 Glossary of Special Terms

Grab: The action of taking an individual sample (normally 1 or 2 ml) from the pipeline.

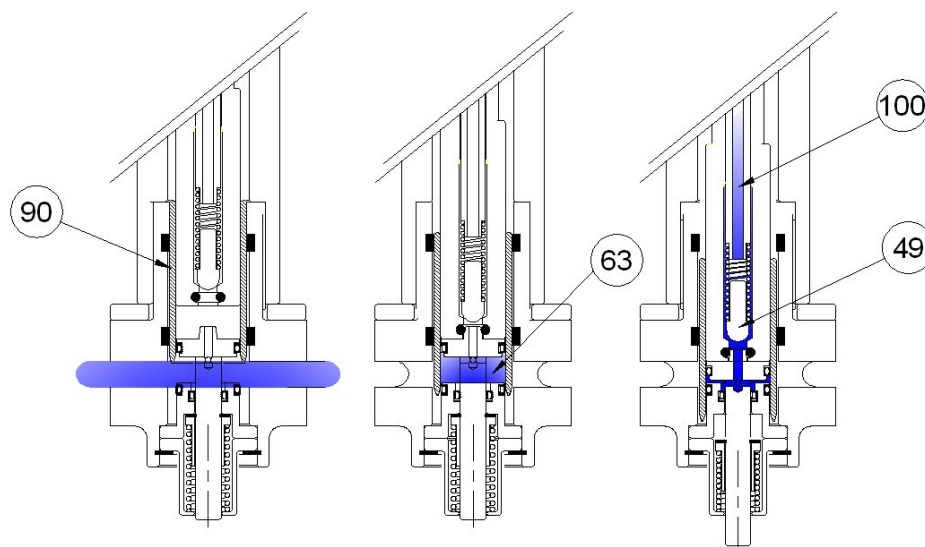


6 Full Functional Description

The 710 MC Electric Sample Probe operates on grab principles similar to previous Jiskoot Samplers, but uses an electric motor to provide the motive power.

The Sample Probe, on grab signal, runs momentary, through one revolution. The Sample Capture Tube following a linear path from the Cam moves downwards, trapping a sample of product in the void between the Sample Plunger (63) and the bottom of the Sample Pillar (65). Continuing downward motion forces the trapped sample through the centre of the Plunger past the Check Valve Tip (49) up the Valve Stem (100). The sample is then expelled through the Outlet Adapter (76) via the external Check Valve to the sample receptacle.

The Cam continues to revolve, in turn allowing the Capture Tube to move away from the Sample Plunger. The Cam passes a positional sensor, which in turn removes power to the motor, positioning the sampler in the dwell position ready for the next grab signal.



7 Utilities Reference

Motor Voltage Available: Three phase only 380-440 Volts 50/60 Hz

Power Consumption 60 Watts (nominal)

Maximum Grab Rate ** 50 grabs/minute at 50Hz operation

**Maximum grab rate is dependant on supply frequency and process conditions (i.e. line pressure and fluid viscosity)

8 Installation Details

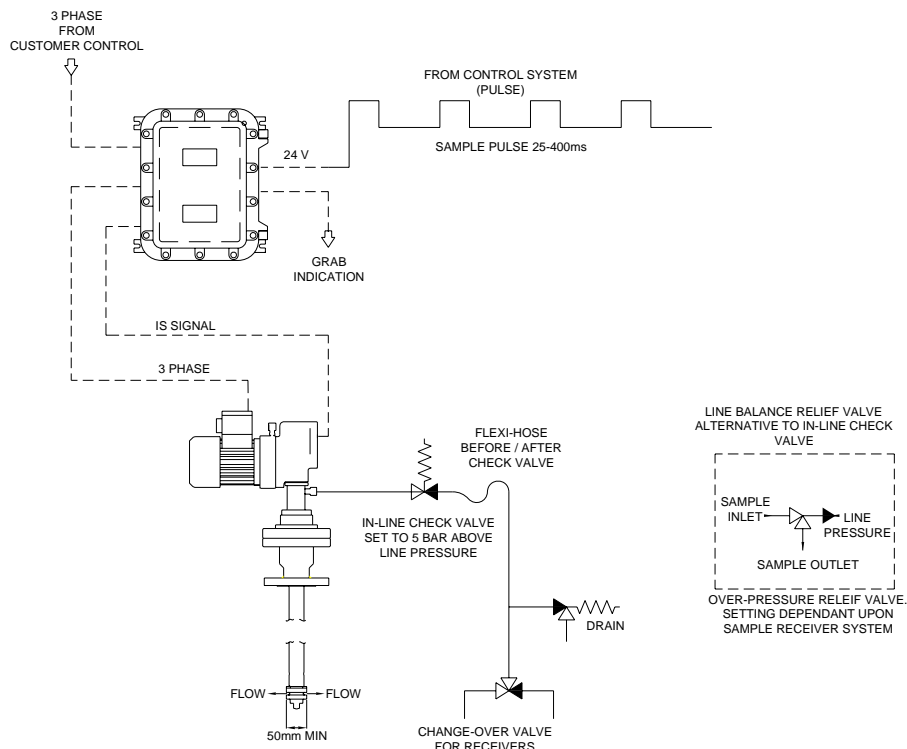
8.1 Installation

The standard 710 MC Electric Probe Sampler is designed to be bolted to a 2" ANSI 150# or ANSI 300#RF flanged tapping either on the top off or on the side of the pipeline and can withstand static pressure testing to full flange rating. To permit the probe head to pass though the tapping, it must be a minimum of 50mm diameter and in line with the isolation valve and mounting flange.

The mounting flange fixing holes must straddle the centre-line of the pipeline to ensure that the direction of the probe head (item 68) is correctly aligned to the line of flow. This is generally indicated by marking or machining arrow on the Support Tube Flange.

Note: *Sample probes may be installed vertically but in accordance with the sampling standards this is a non-preferred method*

The 710 MC Sample Probe is supplied with a Seal Housing, allowing removal from a pressurised line via a full bore valve. It is recommended for both safety and efficiency that the Jiskoot 710 Hydraulic Extractor is employed when installed into, or removing from a flooded or pressurised line. Full details of the use of the Sample Probe with the Extractor are contained in the 710 Hydraulic Extractor Handbook.



The Sample Probe will be supplied with the Motor facing across the pipeline, but may be rotated through 90° *PRIOR TO INSTALLATION* by removing the 4 off M5 Cap Head Screws (48) and turning the Mounting Tube/Gearbox Assembly. Under no circumstances must the Lock Nut (44) be loosened and the Mounting Tube rotated in the Gearbox Housing as this will disturb a critical internal alignment.

The Motor, selected to suit the specific application will require connecting to the MCU via glands and cables appropriate to the area classification. ATEX certified motors are supplied with an M20 cable entry, FM certified motors and solenoids have a ½" NPT entry. Where electrical connections are to be made through conduit, flexible conduits should be used.

External earth tags are provided on the motor to permit adequate bonding of the equipment to the site earth/ground.

The MCU should be connected to the power feed via a suitably fused isolator switch. An Emergency Stop Button is fitted to the MCU with the option of adding an additional remote Emergency stop closer to the Sample Probe providing a means of shutting the Sample Probe off in an emergency.

The Outlet Adaptor (76) must be connected to the Sample Receiver System using ¼" or 6mm stainless steel tubing via either an in-line Check Valve or a Jiskoot Line Balanced Relief Valve and a relief valve as shown in the above diagram.

NOTE: *To allow for the movement of the Sample Outlet at each operation, the in-line Check/Relief Valve must either be directly mounted to the Outlet Adaptor with a flexible hose immediately after it, or connected to the Sample Probe via a flexible hose.*

The Check Valve will normally be set to 5 Bar above the maximum line pressure, ensuring that this is sufficient to allow for any additional pressure increase created by thermal expansion when any isolating valves are closed and the effects of trace heating and or solar energy. If the cracking pressure is set too low, the valve may open under adverse conditions, causing the Sample Receiver System to overflow and the sample to leak through the relief valve to atmosphere.

Where line-balanced, high-pressure sample receivers are being used (i.e. where the sample is being collected at, or close to line pressure), and the installation uses the Swagelok R3A or any similar valves unaffected by back pressure, to avoid placing unnecessary load on the Sampler seals, the Check Valve should be set to operate at 1 Bar. If the valve is found to lift and fill the Sample Receiver due to pressure surges, this setting may be increased slightly.

The relief valve fitted to the sample line is to provide protection to the Sampler in the event of the Sampler being operated against a blocked sample line, e.g. without a sample receiver being fitted or with a full sample receiver. This relief valve should be within the maximum pressure rating of the receiver system, but may need to be increased slightly to allow for momentary pressure surges as the sample is being taken.

Ensure that lengths of tubing connecting the Sample Probe to the receiver system are kept to a minimum to minimise "dead" i.e. trapped volume (long lengths of tubing also create extra back pressure and premature seal wear), and that the sample travels downhill at a minimum angle of 15 degrees from the Sample Probe Outlet to the Receiver to avoid water traps. The sample outlet piping may require heat tracing to prevent blockage.

9 Motor Rotation

Note: *Before commissioning three phase versions of the Sample Probe is it essential to check that the motor will revolve in the correct direction. The 710 EL MC is designed for optimum performance, running in the correct orientation.*

Connect power to the Motor, momentarily apply power to the motor. The **motor** must rotate **anticlockwise** when viewed from the fan end. To reverse direction, change over two phases of the motor supply.

10 Maintenance and Troubleshooting

10.1 Health and Safety Precautions

The 710 MC Sample Probe may be used in applications involving carcinogenic or other hazardous products. Care must be taken to avoid contamination by any product trapped within the internal components that may be released during maintenance or overhaul. Correct P.P.E. should be worn.

10.2 Routine (8 Weekly) Maintenance

It is recommended that the Sample Probe be inspected on a regular basis, with special attention for noise from the gearbox on an 8-week cycle. Should lubrication be required, Jiskoot recommend using a high melting point, general-purpose grease suitable for temperature range of -20°C to +200°C such as *Electrolube*.

Lubricate the motor-end of the gearbox by screwing in the Lubricator (35) fitted to the top of the Motor Adapter (6) until the gearbox is heard to run quietly. When the Lubricator has been fully screwed in, remove the cap and re-pack the Lubricator with grease.

Note: *Avoid greasing the probe excessively, excess grease may solidify or prevent proper operation of the probe. Refer to section 8.3.2 for details of gearbox maintenance.*

10.3 Annual Maintenance

The 710 MC Electric Sample Probe is designed to operate continuously for a period of about 1,000,000 grabs or 12 months before a major overhaul, however this service interval will be affected by the type of product being sampled, particularly the amount of particulate matter such as sand, and therefore can not be guaranteed. When used in crude oils with high levels of sediment or from mixed carrier shipments, the maintenance interval may be shortened. The service intervals will therefore need to be determined from the experience gained on the particular application.

The Sample Probe should be removed from the pipeline and taken to a clean area for servicing.

NOTE: *It is essential that soft vice jaws are used whenever components are required to be held, and that all components, particularly those with sealing faces are thoroughly cleaned of dirt and other contamination by degreasing and drying prior to re-assembly. If any of the sliding surfaces are damaged, leakage will occur from the seals.*

All joints, 'O' Rings and moving parts must be lubricated on assembly using a general purpose grease such as Castrol "Spherol B2" grease or an equivalent lithium based water-resistant grease.

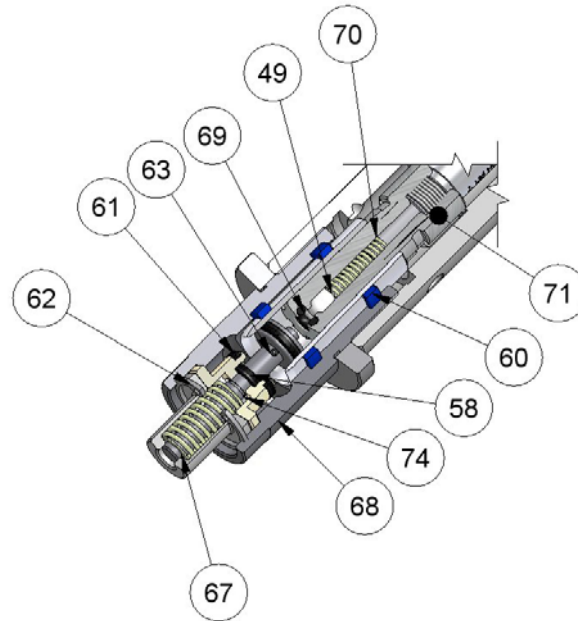
The motor and gearbox components must be lubricated with a high melting point grease such as "Electrolube".

Jiskoot recommend that to prevent seizure, all screwed components are lubricated with copper grease on assembly.

A Special Tool Kit, Part No 45-0173-00, is available to assist in fitting some components and seals. Failure to use the correct tools may damage seals and other components, and will have a direct effect on the future performance of the Sample Probe.

10.3.1 **Sample Probe Seal Replacement**

Sample Head Assembly



Before removing the Sample Head Assembly, take particular note of the position of the Head in relation to the Support Tube and the gap between the Stop Ring and Sample Head.

The Sample Head Assembly is unscrewed from the Support Tube using the 'C' Spanner provided in the Special Tool Kit.

To strip down and overhaul the component parts, carefully remove the Circlip (62), releasing the spring loaded Sample Pillar/Plunger Assembly.

Remove the Circlip (74) from the Sample Plunger (63) and remove the Sample Plunger from the Sample Pillar (65).

Carefully remove the three Balseals using a sharp knife, taking care not to damage the sealing surfaces.

Examine all components for signs of wear, particularly on the sliding surfaces and thoroughly clean to remove any debris. Discard all seals.

Fit the new Balseal (Item 61) after immersing it in warm water to make it more pliable. Grease the seal and carefully ease it over the retaining grooves on the Sample Plunger (Item 63) with the seal spring facing the Sample Plunger shaft. Press the seal firmly into the groove using fingers. Repeat this operation for the second Balseal and the Sample Pillar (Item 65) with the spring to the top of the Pillar.

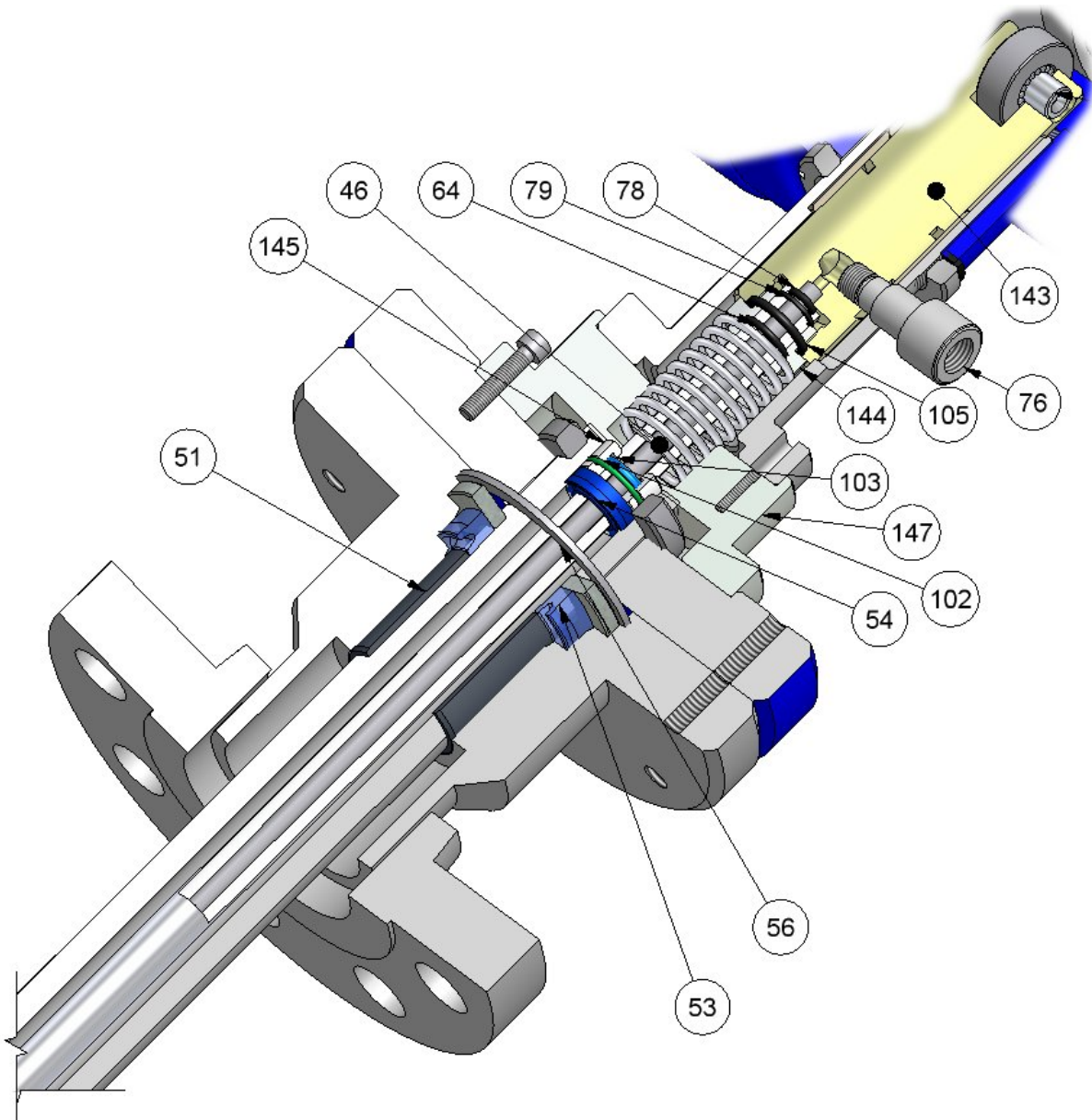
Warm Balseal (Item 58) as above and, using the Sample Pillar Balseal Insertion Tool, push past the retaining lip on the Sample Pillar into the groove with the spring facing up towards the top of the Pillar. Use the inner part of the tool to form the inside edge of the seal to the correct size.

Reassemble the Sample Head Assembly securing the internal components with the Circlip (62).

When refitting the Sample Head (68) to the Support Tube (80) it is essential to ensure that the clearance between the Sample Plunger (63) and the bottom of the Capture Tube Mount (71) is maintained between 0.010" and 0.020" (0.25mm and 0.5mm).

To establish the correct location of the Sample Head, insert a 3mm Allen Key in the M5 tapped hole within the Cam, rotate the Cam anticlockwise to position the Capture Tube at the bottom of its travel. Screw the Sample Head onto the Support Tube until the Sample Plunger has been fully depressed by the Capture Tube Mount. Unscrew the Sample Head by 90° and continue until the ports in the head align with the vent hole in the Support Tube and the "Flow" arrow on the Seal Housing. Tighten the locking ring. Check that clearance exists by rotating the Cam through a complete revolution and ensuring that there is no evidence of the Sample Plunger binding against the Capture Tube Mount.

Capture Tube Seal



Remove the 4 off M5 Cap Head Screws retaining the Mounting Tube to the Adapter Block (147), noting the orientation of the Motor/Gearbox Assembly to the Support Tube Flange.

Unscrew the Outlet Adapter (76), and lift the Motor and Gearbox assembly off the Adapter Block (147), leaving the Capture Tube and Cam Follower Assembly (143) in the Support Tube.

Unscrew the Capture Tube Retaining Nut (144) from the Cam Follower (143).

Carefully remove the Circlip (79) to release the Capture Tube Retaining Nut from the Capture Tube and remove Spring (46).

Unbolt the Adapter Block (147) from the Support Tube.

Withdraw the Capture Tube Assembly through the Support Tube, allowing the end of the Capture Tube to pull the Seal (54) and Seal Retainer (145) from the end of the Support Tube.

Remove the 'O' Ring (78) from the inside of the Cam Follower.

Remove the Valve Stem, Spring (70), and Check Valve Tip (49) from the inside of the Capture Tube.

Carefully prise out the Check Valve 'O' Ring (69) from the end of the Capture Tube using the Check Valve 'O' Ring Removal Tool.

Clean and examine all components for wear, and discard all seals. Any visibly worn components should be replaced.

Reassemble all components, greasing all sealing and sliding surfaces and ensuring that the Seal (54) is fitted the correct way round.

The 'O' Ring (69) is replaced after the Capture Tube has been refitted to the Cam Follower. Place Check Valve 'O' Ring Removal Tool inside the Capture Tube Sleeve, lightly grease the 'O' Ring and use Check Valve 'O' Ring Insertion Tool to push the 'O' Ring through Capture Tube Sleeve Tool into the Capture Tube Mount.

Seal Housing Seal

To replace the Seal (53) in the Seal Housing, it is necessary to remove the Sample Head Assembly and to withdraw the complete Sample Tube/Motor/Gearbox Assembly from the Seal Housing.

Remove the Sample Head Assembly as described earlier. If the Capture Tube/Motor/Gearbox Assembly has not already been removed as described above, and it is not intended to replace the Capture Tube Seal, release the complete Sample Tube/Motor/Gearbox Assembly from the Seal Housing by removing the 4 M10 Cap Head Screws, and withdraw the complete assembly from the Seal Housing.

If the Capture Tube/Motor/Gearbox Assembly has previously been removed, unbolt the Support Tube Flange from the Seal Housing by removing the 4 M10 Cap Head Screws, and withdraw the Support Tube from the Seal Housing.

Remove the Circlip (56) from the Seal Housing using a pair of circlip pliers, and remove the Seal Retainer and Seal.

Clean all components and reassemble, fitting the new Seal.

10.3.2 The Gearbox

Assembly should normally only require to be stripped down to remove the old grease and then reassembled.

Motor/Gearbox Replacement

Due to the need for special tools and the fine tolerancing of the internal gears, field servicing or replacement of the Motor and Gearbox is not recommended. In the event of failure of these components, the entire Sample Probe should be returned to Jiskoot for repair.

11 Frequently Asked Questions

11.1 Sample Probe Fails to take any sample

Check product is available to Sample Probe, and all valves are open

Check motor is running - feel or listen for operation.

Is sampler being energised? - Check power and signal from MCU

Check Sample Probe Controller is demanding a grab and that any interposing relays are operating satisfactorily.

Check that Sample Receiver is not either full, blocked by wax or isolated (Carefully loosen –" connections in sample discharge tubing to test).

If the above are satisfactory, than the Sample Probe may require a change of internal seals.

11.2 Sample Probe fails to take adequate sample

Check Sample Receiver is not full or the sample outlet piping blocked through waxing.

Check the external Check Valve fitted to Sample Probe Outlet Adapter is set to 5 Bar above line pressure for normal low-pressure receiver systems and to 1 Bar where high pressure sample receivers are being used. If pressure is too high, excessive wear will be caused to the Sample Probe internal seals.

Check that the relief valve fitted to the sample discharge lines is not passing.

Check that the Armature is not sticking in the Armature sleeve by manually pulling the brass Stop Screw out of the Armature Sleeve and releasing.

Check the magnetic sensor is not sticking through excessive or old grease in the mechanism.

Ensure that the Sample Probe Controller is not either demanding too fast a sample grab rate (60 grabs per minute maximum at 50Hz operation), or that the signal to the sensor is too fast.

If the above are satisfactory, than the Sample Probe may require a change of internal seals.

11.3 Sample Probe takes excessive sample

Check the external Check Valve fitted to Sample Probe Outlet Adapter is set to 5 Bar above line pressure for normal low-pressure receiver systems and to 1 Bar where high-pressure sample receivers are being used. If pressure is too low, then the internal Check Valve may be lifting allowing sample to pass at all times.

Ensure that the Sample Probe Controller is not either demanding too fast a sample grab rate (60 grabs per minute maximum at 50 Hz), or that the signal to the sensor is too slow, and not allowing disengagement.

12 Sub Supplier Information

The following sub supplied items are used in the 710 Electric Sample Probe:

Euromotori Motor Series ASA 56 selected to suit the application specific hazardous area and power supply requirements.

Pepperl+Fuchs Magnetic proximity switch and sensor.

Neither component contains any user serviceable parts.

13 Recommended Spares List

When requesting assistance or spare parts, please advise the Sample Probe Model and Serial Numbers to ensure that the correct options are supplied.

Part/Sub- Assembly			Commissioning	1 Year Operation	2 Year Operation
Spare Parts Kit 45-0170-MC comprising:			1	1	1
Item No.	Description	Part No.			
47	Spring	40-0207-00			
49	Check Valve Tip	36-3129-00			
53	Seal	37-0570-00			
54	Seal	37-0730-00			
56	Circlip	37-0571-00			
58	Balseal	37-0573-00			
60 (2 off)	Slydring	37-0518-00			
61 (2 off)	Balseal	37-0540-00			
62	Circlip	37-0574-00			
67	Spring	40-0204-00			
69 (2 off)	'O' Ring	37-0572-00			
70	Spring	40-0089-00			
74	Circlip	37-0602-00			
75	Lower Spring Guide	36-3139-00			
78	'O' Ring	37-0581-00			
79	'O' Ring	37-0582-00			
Special Tool Kit 45-0173-00 comprising:			1	-	-
Description		Part No.			
'C' Spanner		36-2000-00			
External Circlip Pliers		36-2042-00			
Internal Circlip Pliers		36-2043-00			
8mm Allen Key		36-2044-00			
4mm Allen Key		36-2045-00			
Sample Plunger 'O' Ring Insertion Tool		36-2046-00			
Sample Plunger 'O' Ring Guide Tool		36-2047-00			
Sample Plunger 'O' Ring Hook		36-2048-00			
Sample Plunger Shaft Balseal Insertion Tool		36-2049-00			
Sample Plunger Shaft Balseal Insertion Guide		36-2050-00			

14 Product Specific Drawings

B23833 General Arrangement Drawing – 710 A Length Probe

15 Disclaimer

Whilst Jiskoot Limited has taken every care in the preparation of this document, it cannot accept responsibility for printing errors or omissions and does not warrant that it is correct and comprehensive in every particular. Equipment supplied should always be operated by persons with an appropriate level of skill and training.

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0	First issued (Based on rev 5 710 EL)	N. McGee	P.Whittle	16/10/2007
Issue	Revision History	Issued	Approved	Date

Notes

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