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Rockwell Automation + Schlumberger

+ MEASUREMENT SOLUTIONS

OPERATING,

INSTALLATION & MAINTENANCE MANUAL

FOR

JISKOOT™ SERIES

210 SAMPLE PROBE AND VARIATIONS

Manual No.H15, Rev. 16

Important Safety Information

Symbols used in this manual:

This symbol identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

This symbol indicates actions or procedures which if not performed correctly may lead to personal injury or incorrect function of the instrument or connected equipment.

Terms used in this manual:

Note	Indicates actions or procedures which may affect instrument operation or may lead to an instrument response which is not planned.

Regular Inspection AT LEAST ANNUALLY of any installation for corrosion is mandatory to safety. This assembly uses bolts under tension when inserted into a pipeline. Corrosion of these bolts can lead to failure, leakage, ejection and life threatening personal injury and significant environmental and infrastructure damage.

Any replacement parts should be provided by the OEM and service by qualified staff suitably trained. Bolts must meet the original design specification for strength, dimensions and coating protection and installed in accordance with this manual. In case of doubt, consult the factory.

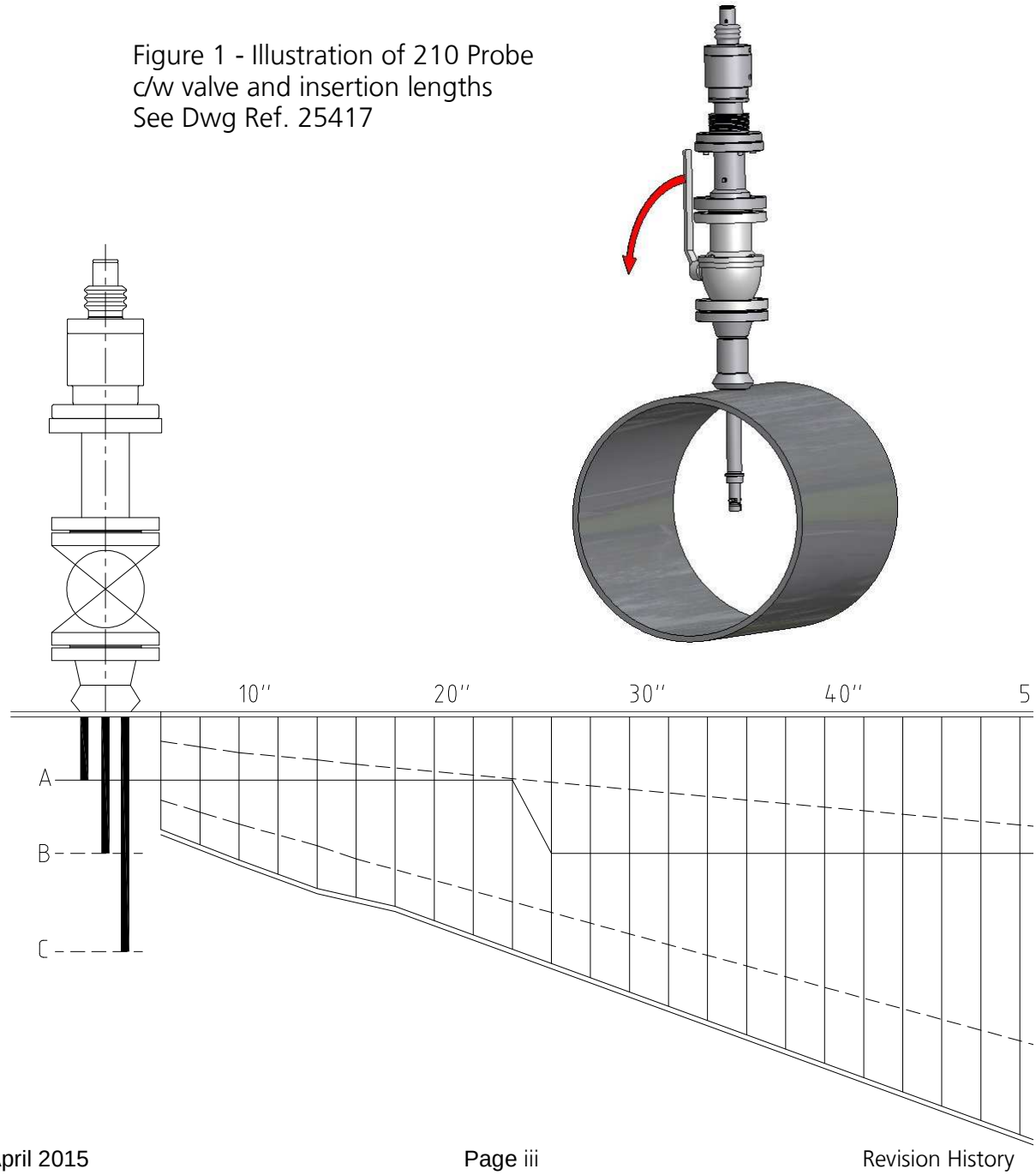
Technical Support Contact Information:

Sensia LLC
200 Westlake Park Blvd
Houston, TX 77079
+1-866-773-6742
sensiaglobal.com

Document Revision History:

Issue	Description of Change	Issued	Approved	Date
16	Capture Tube Seal, external Check valve setting	NMc	PW	Apr 2015
15	Format, Amend Testing Section 11	NMc	PW	July 2014
14	Service Kits added, Extractor Height, Addendums	NMc	MAJ	27 Nov 12
13	Graphic's updated	NMC	PW	26/03/2008
12	Revised to reflect redesigned seal housing and capture tube seal arrangements, 2cc addenda & assembly illustrations	NMC	PW	22/01/2008
11	Check Valve and Relief Valve settings clarified	PW	MAJ	15/02/2006
10	Added typical installation sketch and minimum diameter of pipeline tapping	PW	MAJ	25/01/2005
9	Generally revised, drawings added	PW	QI02/24	15/1/2002
Issue	Revision History	Issued	Approved	Date

Figure 1 - Illustration of 210 Probe c/w valve and insertion lengths See Dwg Ref. 25417



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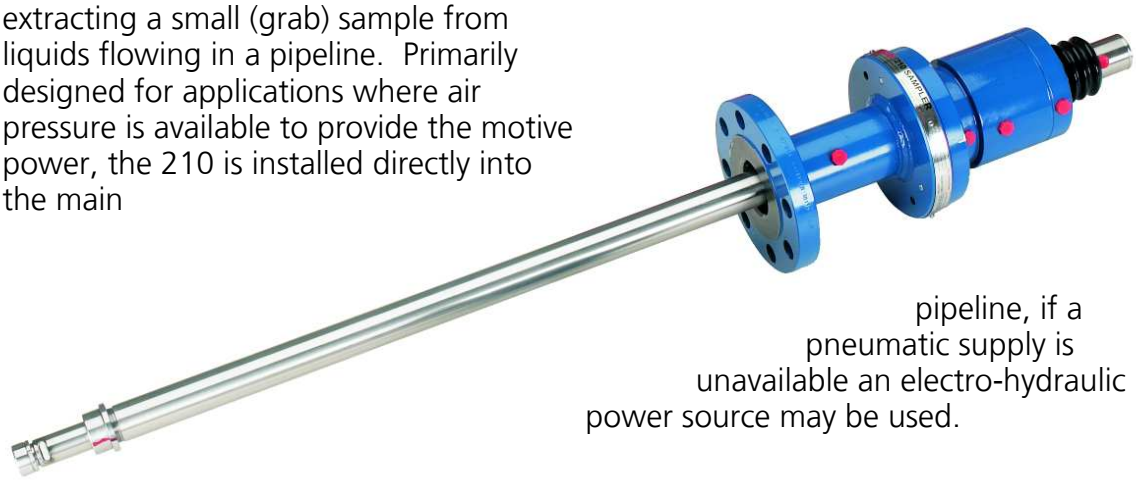
1 Introduction

The 210 Sampler provides a means of extracting a small (grab) sample from liquids flowing in a pipeline. Primarily designed for applications where air pressure is available to provide the motive power, the 210 is installed directly into the main pipeline, if a pneumatic supply is unavailable an electro-hydraulic power source may be used.



The Jiskoot™ Series 210 Sample Probe is designed to extract a nominal 1cc or optional 2cc sample typically from crude oil, refined hydrocarbons (including non-lubricating products) and chemicals compatible with its materials of construction, the standard model is certified to operate up to a maximum pressure to 150 Barg, within a process temperature range of -20 to 100°C, on viscosities 0.5 to 8000cSt in an ambient temperature range of -20°C to 60°C. Optional models are available for extreme service including extended temperature ranges (210 HT) and for sediment rich fluids (210 SD).

The 210 Sampler is designed to be installed and withdrawn through a flanged tapping in the pipeline. A "Short Style" Sampler version can mounts directly onto the pipeline tapping and requires the pipeline to be depressurised for installation and withdrawal. All other 210 Samplers mount with a full bore ball isolating valve, enabling the Sampler to be installed and withdrawn without the need for depressurisation when used with a Jiskoot Hydraulic extractor.

Note **Do not attempt insertion or withdrawal of the 210 Sample Probe without the optional 154 Series Hydraulic Extractor on pressurised pipelines. Refer to Section 9.1.2**

The following chart displays the Jiskoot™ range of 210 Samplers.

- P and HP indicate pneumatic actuated,
- EH and EHHP indicate hydraulically actuated, (External hydraulic system)
- HT indicate High Temperature (Available as pneumatic, high pressure and severe duty)
- SD indicate Severe Duty (sediment rich fluids)

210 Sampler Model	Motive Power	Flange size	Flange rating	Connection	Withdrawable	Pipeline velocity
210 P Available as HT and SD	Pneumatic	3" Std (2" Optional)	150# 300# / 600#	RF	Yes	A - 9.4 m/s B - 6.9 m/s C - 4.8 m/s Dependent On viscosity
210HP Available as HT and SD	Pneumatic	3" Std (2" Optional)	600# 900# /1500#	RF - RTJ	Yes	
210EH Available as HT and SD	Hydraulic	3" Std (2" Optional)	150# 300# / 600#	RF	Yes	
210 EH HP Available as HT and SD	Hydraulic	3" Std (2" Optional)	600# 900# /1500#	RF - RTJ	Yes	
210 Short Style Available as HT and SD	Pneumatic or Hydraulic	3" Std (2" Optional)	150 - 600#	RF	No	9.4 m/s

See drawing reference 25417 for insertion lengths related to API/ISO standards.

The 210 Sampler is supplied in three lengths options to suit the pipeline diameter and method of installation, and with three actuator options. These are:

'A' Length for pipeline diameters typically 8"-14"

'B' Length for pipeline diameters typically 16" - 28"

'C' Length for pipeline diameters typically 30" - 52"

Standard air actuated Sample Probe

210 HP Air actuated Sample Probe for high-pressure (ANSI 900#) applications or where there is low air pressure (<5 Barg).

210 EH Sample Probe fitted with Electro-Hydraulic actuator for use with a Hydraulic Power Pack on installations without a suitable air supply.

210 SS Short Style Sampler Probes are designed for direct mounting to small diameter pipelines without isolation valve and require depressurised lines for install and withdrawal.

Note: When requesting assistance or spare parts, please provide the Sampler Model and Serial Numbers to be found on a label attached to the actuator to ensure that the correct options are noted.

2 Operating Instructions

The Sampler must be installed in accordance with the Installation Details in section 9 be connected to a suitable sample receiver, via an external line balanced or relief/check valve and operated and maintained as detailed below.

To actuate, the Sampler requires a regulated motive force (normally air) supply at 5 - 8 Barg (70 - 120 psig), this must be applied in sequence to the actuator for appropriate times. Typically a solenoid valve is used to switch and vent the actuation source at the required intervals. Where the sampler comprises part of a system, to meet with the requirements of the appropriate controlling standards if fitted a pipeline conditioning facility must operating to ensure a representative sample may be taken. Electro-Hydraulic versions (210 EH) require a Hydraulic Power Pack to provide the actuation source.

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

3 Glossary of Special Terms

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

4 Utilities Reference

Air Supply (Filtered)		4 - 10 Barg (40 - 145 psig)
Air Consumption*	210 standard Probe	0.8 m3/hr or 0.47 scfm (5 Barg at 30 grabs/min)
	210 HP Probe	1.67 m3/hr or 1.0 scfm (5 Barg at 30 grabs/min)
Solenoid Voltages Available:	AC	100-254 Volts 50/60 Hz
	DC	24 Volts DC
	Power Consumption	10 Watts
Solenoid energisation time		500 ms
Maximum Sampling Rates*	210 standard Probe	120 Samples/min
	210 HP Probe	60 Samples/min
	210 EH Probe	50 Samples/min
	210 EH-HP	30 Samples/min

Note: * Maximum grab rate, air consumption and supply requirements are dependent on process conditions, i.e. line pressure and viscosity, together with motive power hose size and condition.

5 Full Functional Description

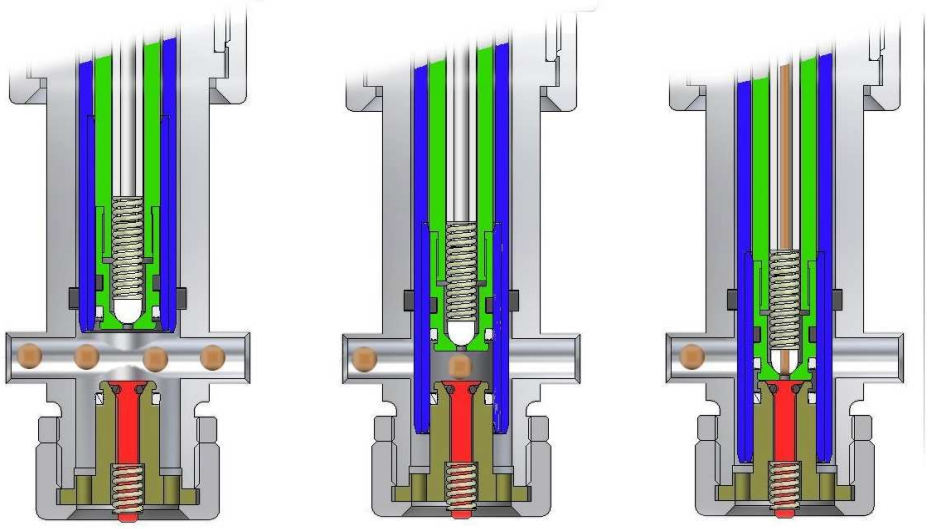


Figure 2 – Functional Description

The 210 Sample Probe operates on Jiskoot's standard 3-step principle, using an air or hydraulically actuated piston to provide the motive power.

In the idle, or de-energised state, air or hydraulic pressure is applied to the bottom of the Actuator Housing (Figure 3, Item 13) through Port 'B', holding the Capture Tube and the Sample Tube at the top of their stroke, and allowing the product to flow through the Probe Head (Figure 3, item 37).

When the external Sampler Solenoid is energised (Figure 11, page 15), it applies air or hydraulic pressure to Port 'A', onto the top of the Piston (Figure 3, item 15) while venting the pressure from the underside to atmosphere. The pressure on the Piston moves the Capture Tube (Figure 3,item 92) trapping a sample of product inside the Capture Tube in the void between the Sample Tube (Figure 3, item 94) and the End Plug.

Continuing downward motion pushes the Catchplate (Figure 3, Item 17) against the Sample Tube Actuator (Figure 3, item 16), moving the Sample Tube down with the Capture Tube and forcing the trapped sample through the centre of the Sample Tube past the Check Valve Tip (Figure 3, Item 91). The sample is then expelled from the Sample Outlet Port in the Sample Tube Head (Figure 3, Item 19) through the external Check Valve to the sample receptacle.

When the Sampler Solenoid is de-energised, air is vented from the top side of the Actuator Piston and applied to the underside of the Piston, moving the Capture Tube and Sample Tube away from the End Plug, whereupon an vacuum Breaker (Figure 3, Item 44) incorporated in the End Plug momentarily opens to relieve the vacuum created in the void between Sample Tube and End Plug.

Fresh product can now pass through the Probe Head and the Sampler is ready for the next grab to be initiated. (See following diagrams for component locations)

6 General Assembly & Bill Of Material 210

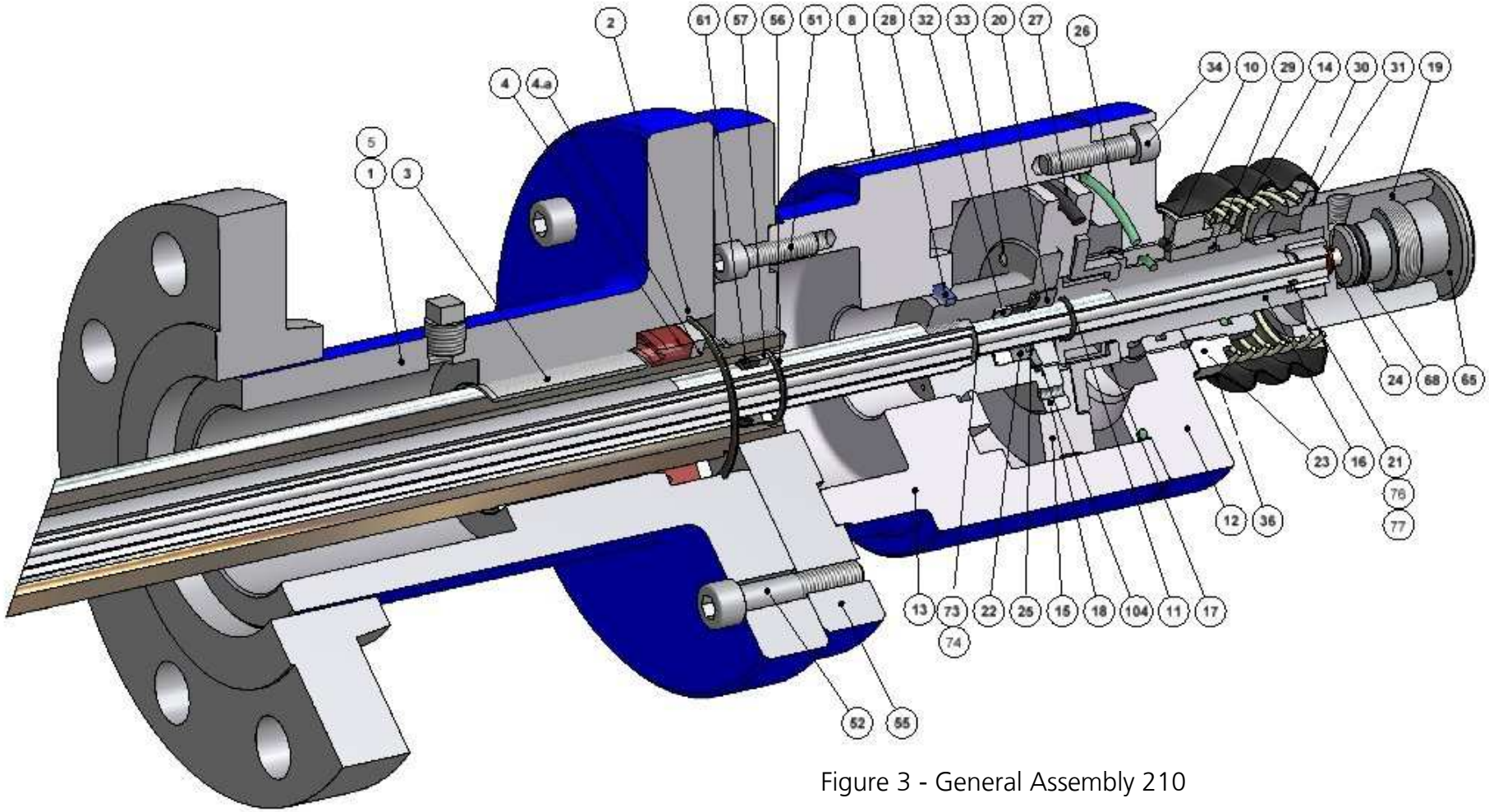


Figure 3 - General Assembly 210

(Drawing Ref 17840

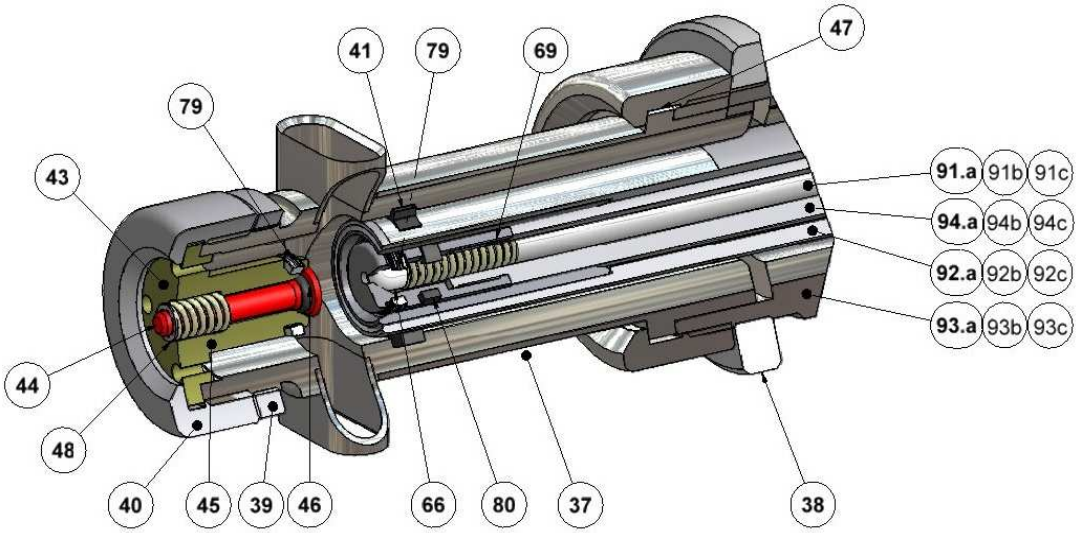


Figure 4 - Probe Head General Assembly 210

In the first quarter of 2006, the 210 Sampler Seal Housing seal retainer was revised from screwed to circlip, with the seal housing and support tube flange revised to suit a 4 hole mounting (as opposed to the former 3 bolt) allowing head rotation at 90 deg. Intervals (Figure 5).

An improved "O" ring energised seal arrangement is incorporated within the Seal Housing, as supplied as part of the standard spare parts kit a direct replacement for previous "Twinset" seal. The anti-extrusion spacer (Figure 5, Item 4a), is only utilised within post 2006 seal housings.

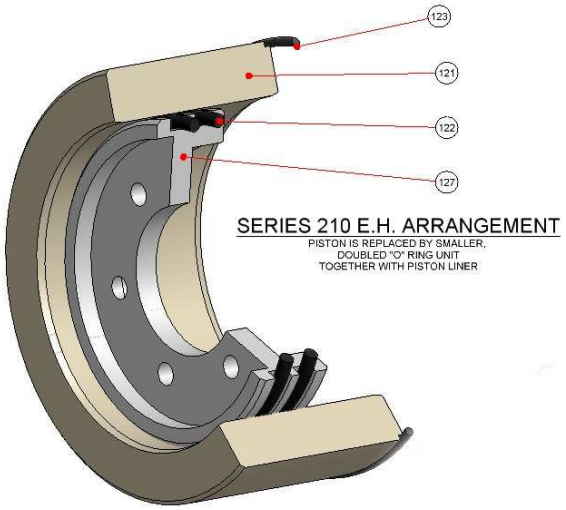


Figure 6 - EH arrangement

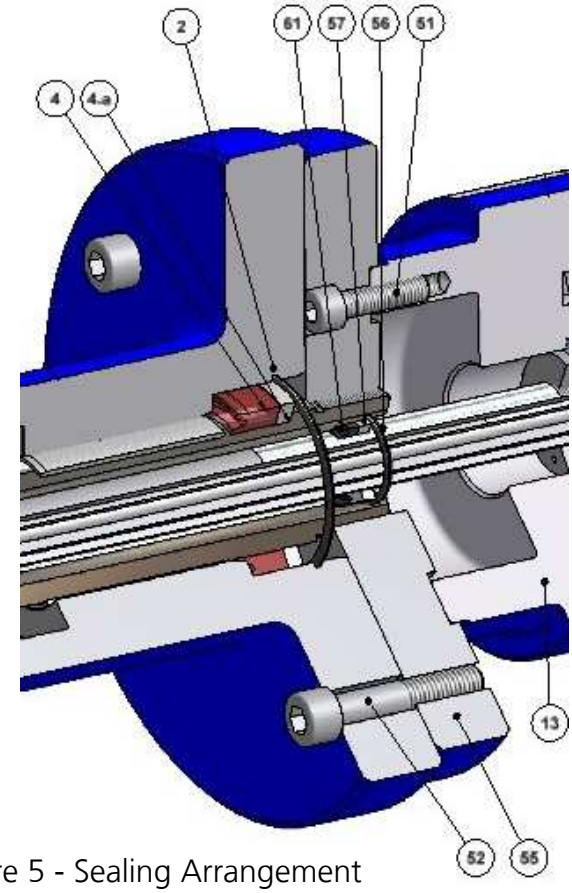


Figure 5 - Sealing Arrangement

210 Standard Bill of Materials (Figure 3 & 3)					
Item No	Description	Part Number	Item No	Description	Part Number
1	Seal Housing	36-3324-06	2	Smalley Ring	37-0797-00
3	Support Tube Bush	39-0408-00	4	"U" Seal	37-0795-00
			4a	Seal Backing Ring	37-4503-00
5	Hexagon Plug	48-0330-00	6		
7			8	Label	33-0238-00
9			10	'O' Ring	37-0701-00
11	'O' Ring	37-0705-00	12	Top Housing	36-1183-00
13	Bottom Housing	36-1184-00	14	Bush	36-1185-00
15	Piston	36-1186-00	16	Sample Tube Actuator	36-1187-00
	Piston Pneumatic and EHHP	36-1215-00			
17	Catchplate	36-1188-00	18	Lower Piston Rod	36-1189-00
19	Sample Tube Head	36-1101-00	20	Seal Nut	36-1102-00
21	Split Collet	36-1103-00	22	Seal Ring	36-1190-00
23	Lock Ring	36-1191-00	24	Flat Washer – M6	
25	Quadring	37-0551-00	26	'O' Ring	37-0015-00
27	'O' Ring	37-0033-00	28	Quadring Seal	37-0544-00
29	'O' Ring	37-0706-00	30	Spring	40-0082-00
31	Split Collar	36-1209-00	32	Seal	37-0730-00
33	Cap head Screw (10.9) M5 x 20	99-0027-01	34	Cap head Screw (10.9) M8 x 35	99-0094-00
35			36	Gaiter	48-0465-00
37	Probe Head Assembly	36-1198-00	38	Lock Ring	36-1134-00
39	Lock Ring	36-1203-00	40	Lock Nut	36-1202-00
41	Slydring	37-0518-00	42	Balseal 1cc	37-0519-00
			42	Balseal (2cc)	37-0540-00
43	End Plug	36-1212-00	44	Vacuum Breaker Valve	36-1213-00
43	End Plug (2cc)	36-1381-00			
45	Spring	40-0083-00	46	'O' Ring	37-0702-00
47	Roller – 2.4 x 10mm		48	Fastener – 5/32	99-0003-00
51	Cap head Screw M8 x 30	99-0034-00	52	Cap head Screw (10.9) M10 x 45	99-0075-00
55	Support Tube Flange	36-3344-06	56	Smalley Ring	37-0796-00
57	Anti-extrusion Ring	36-4504-00	58	Shim – 0.010" Thick	48-0437-00
59	Shim – 0.020" Thick	48-0438-00	60		
61	Capture Tube Seal	37-0621-HL	62		
65	Nut	36-1061-00	66	Check Valve Tip	36-1229-00
67			68	'O' Ring	37-0517-00
69	Spring	40-0089-00	70		
73	Shim – 0.010" Thick	48-0439-00	74	Shim – 0.020" Thick	48-0440-00
75			76	Shim – 0.010" Thick	48-0441-00
77	Shim – 0.020" Thick	48-0442-00	78		
79	Balseal 1cc	37-0519-00	80	Slydring	37-0532-00

210 Standard Bill of Materials (Figure 3 & 3)					
Item No	Description	Part Number	Item No	Description	Part Number
79	Balseal (2cc)	37-0540-00	80	Slydring (2cc)	37-0541-00
91	Valve Stem – A	36-1238-00	92	Capture Tube - A	36-1390-00
91	Valve Stem – B	36-1239-00	92	Capture Tube - B	36-1391-00
91	Valve Stem – C	36-1240-00	92	Capture Tube – C	36-1392-00
93	Support Tube - A	36-1178-SD	94	Sample Tube – A	36-1218-00
93	Support Tube - B	36-1179-SD	94	Sample Tube – B	36-1219-00
93	Support Tube - C	36-1180-SD	94	Sample Tube – C	36-1220-00
95	EH Piston Liner	36-1216-00	96	'O' Ring	37-0704-00
97	'O' Ring	37-0713-00	98		
99			100	EH Label	33-0246-00
101	EH Piston	36-1215-00	102		
103			104	'O' Ring	37-0550-00

Note Any corroded and worn parts and expendable items such as bolts and seals should be replaced with OEM (Original Equipment Manufacturer) spares of the correct specification. All information is correct at the time of print and is subject to change.

7 General Assembly & Bill Of Material 210 SD

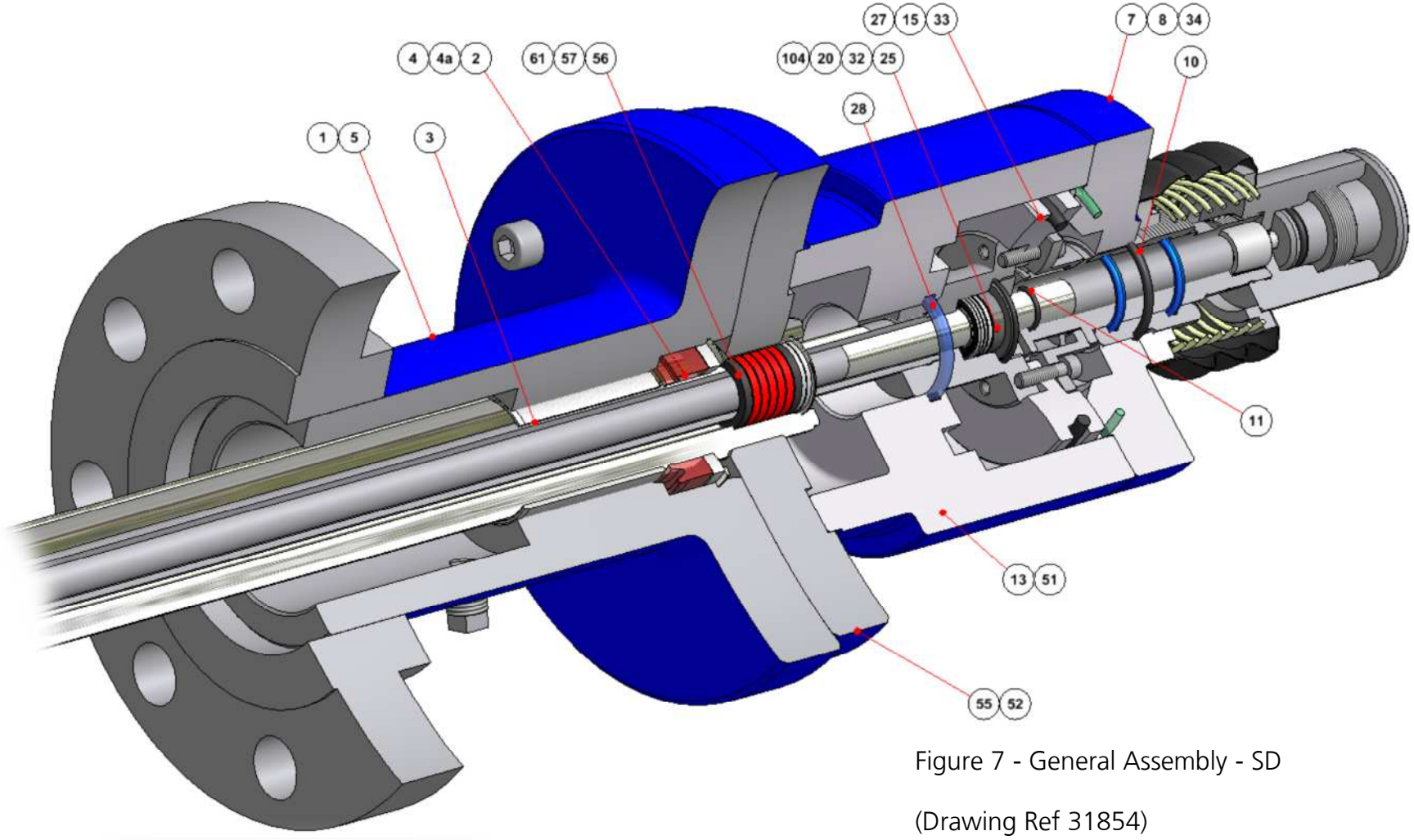


Figure 7 - General Assembly - SD

(Drawing Ref 31854)

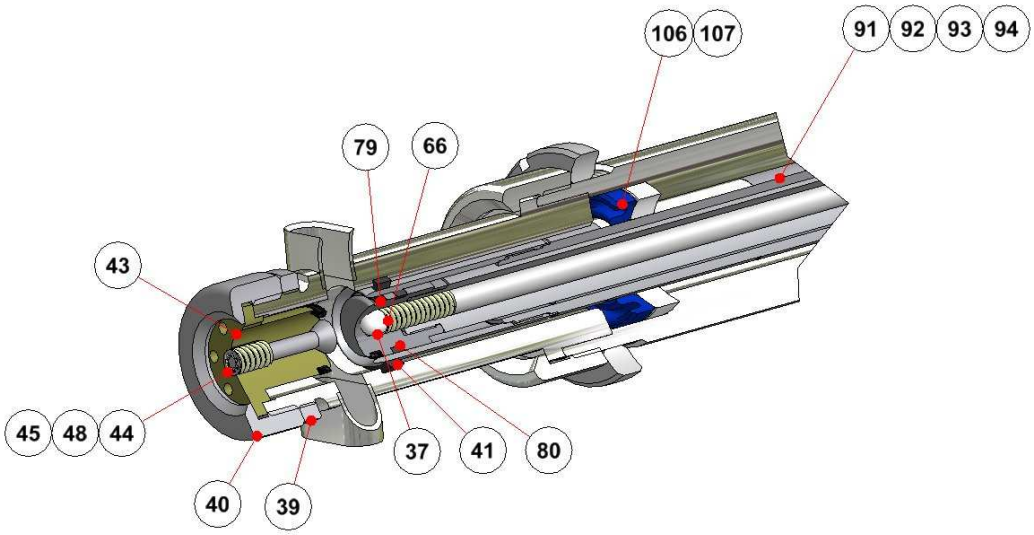


Figure 8 – SD Probe Head General Assembly

In the first quarter of 2011, the 210 'SD' Sampler was introduced utilising a revised sealing arrangement between the Support Tube and Capture Tube.

The Support Tube arrangement is not interchangeable with the earlier version.

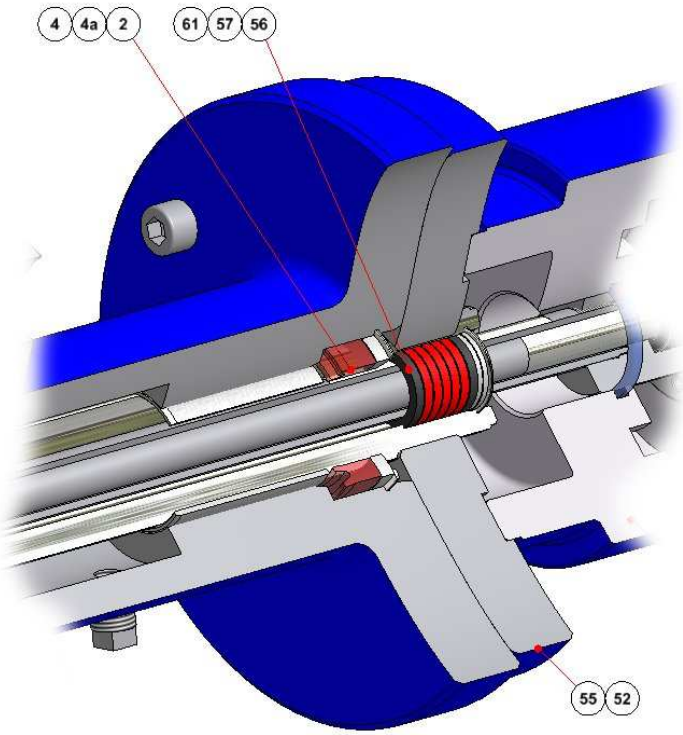


Figure 9 - SD Sealing arrangement

210 SD Probe BOM (Figure 8)					
Item	Description	Part Number	Item	Description	Part Number
1	Seal Housing	36-3324-06	2	Smalley Ring	37-0797-00
3	Support Tube Bush	39-0408-00	4	"U" Seal	37-0795-00
			4a	Seal Backing Ring	37-4503-00
5	Hexagon Plug	48-0330-00	6		
7			8	Label	33-0238-00
9			10	'O' Ring	37-0701-00
11	'O' Ring	37-0705-00	12	Top Housing	36-1183-00
13	Bottom Housing	36-1184-00	14	Bush	36-1185-00
15	Piston	36-1186-00	16	Sample Tube Actuator	36-1187-00
	Piston Pneumatic and EH	36-1215-00			
17	Catchplate	36-1188-00	18	Lower Piston Rod	36-1189-00
19	Sample Tube Head	36-1101-00	20	Seal Nut	36-1102-00
21	Split Collet	36-1103-00	22	Seal Ring	36-1190-00
23	Lock Ring	36-1191-00	24	Flat Washer – M6	
25	Quadring	37-0551-00	26	'O' Ring	37-0015-00
27	'O' Ring	37-0033-00	28	Quadring Seal	37-0544-00
29			30	Spring	40-0082-00
31	Split Collar	36-1209-00	32	Seal	37-0730-00
33	Cap head Screw M5 x 20	99-0027-01	34	Cap head Screw (10.9) M8 x 35	99-0094-00
35			36	Gaiter	48-0465-00
37	Probe Head – Welded Assembly	36-1198-00	38	Lock Ring	36-1134-00
39	Lock Ring	36-1203-00	40	Lock Nut	36-1202-00
41	Slydring	37-0518-00	42	Balseal 1cc	37-0519-00
			42	Balseal (2cc)	37-0540-00
43	End Plug	36-1212-00	44	Vacuum Breaker Valve	36-1213-SL
43	End Plug (2cc)	36-1381-00			
45	Spring	40-0083-00	46	'O' Ring	37-0702-00
47	Roller – 2.4 x 10mm		48	Fastener – 5/32	99-0003-00
49			50		
51	Cap head Screw M8 x 30	99-0034-00	52	Cap head Screw (10.9) M10 x 45	99-0075-00
55	Support Tube Flange	36-3344-06	56	Smalley Ring	37-0796-00
57	Anti-extrusion Ring	36-4504-00	58	Shim – 0.010" Thick	48-0437-00
59	Shim – 0.020" Thick	48-0438-00	60		
61	Seal	37-0818-00	62		
65	Nut	36-1061-00	66	Check Valve Tip	36-1229-00
67			68	'O' Ring	37-0517-00
69	Spring	40-0089-00	70		
73	Shim – 0.010" Thick	48-0439-00	74	Shim – 0.020" Thick	48-0440-00
75			76	Shim – 0.010" Thick	48-0441-00
77	Shim – 0.020" Thick	48-0442-00	78		
79	Balseal 1cc	37-0519-00	80	Slydring	37-0532-00
79	Balseal (2cc)	37-0540-00	80	Slydring (2cc)	37-0541-00

210 SD Probe BOM (Figure 8)					
Item	Description	Part Number	Item	Description	Part Number
91	Valve Stem – A	36-1238-00	92	Capture Tube - A -SD	36-1390-SD
91	Valve Stem – B	36-1239-00	92	Capture Tube - B -SD	36-1391-SD
91	Valve Stem – C	36-1240-00	92	Capture Tube – C -SD	36-1392-SD
93	Support Tube – A -SD	36-1178-SD	94	Sample Tube – A	36-1218-00
93	Support Tube – B -SD	36-1179-SD	94	Sample Tube – B	36-1219-00
93	Support Tube – C -SD	36-1180-SD	94	Sample Tube – C	36-1220-00
95	EH Piston Liner	36-1216-00	96	'O' Ring	37-0704-00
97	'O' Ring	37-0713-00	98		
99			100	EH Label	33-0246-00
101	EH Piston	36-1215-00	102		
103			104	'O' Ring	37-0550-00
106	Seal	37-0731-00	107	Anti-Extrusion	36-1195-00

Note Any corroded and worn parts and expendable items such as bolts and seals should be replaced with OEM (Original equipment manufacturer) spares of the correct specification. Part Numbers correct at time of print, Items may change, please consult Jiskoot Spares if in doubt

8 General Assembly & Bill Of Material 210 SHORT STYLE

Illustrating the 210 Short Style in HT variant (High Temperature) Sampler, see 210 Sampler for Bill of material (Page 5)

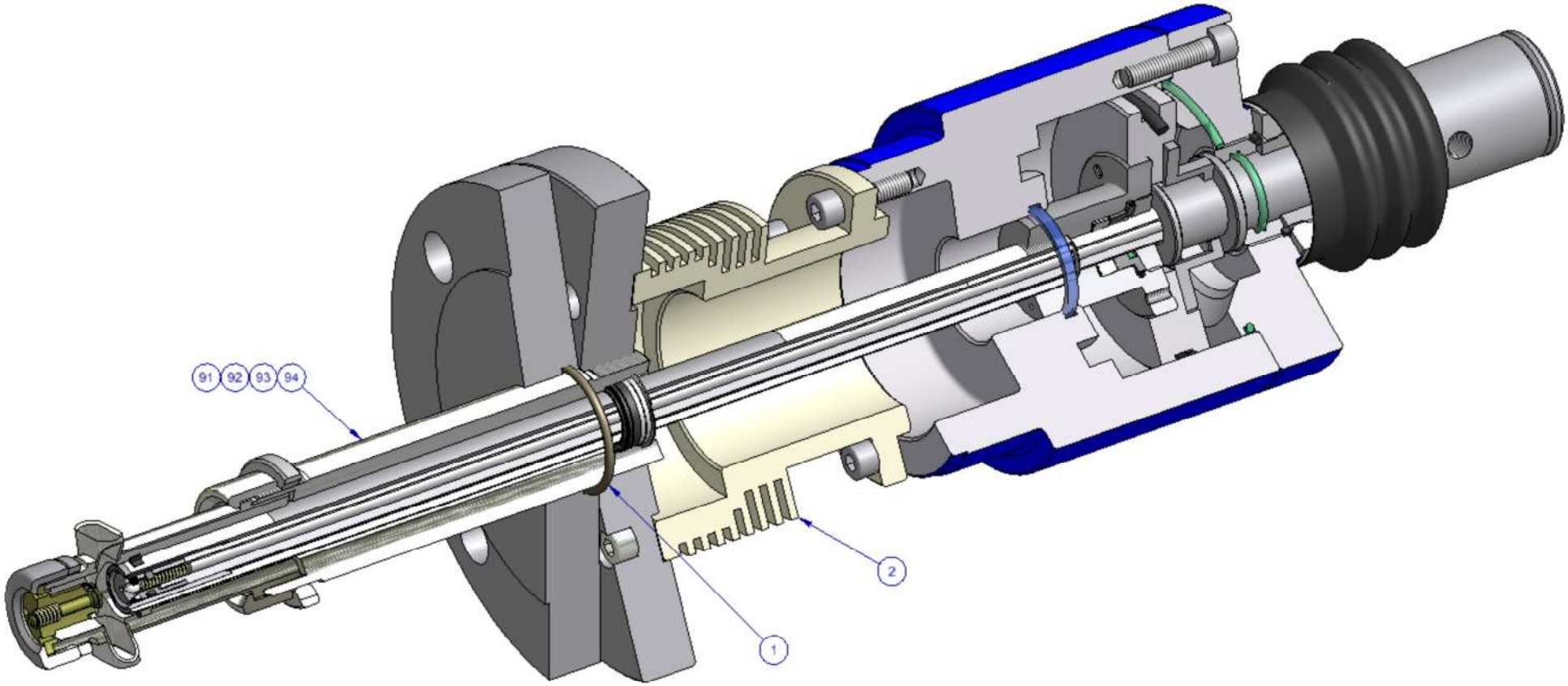


Figure 10 - General Assembly Short Style

(Drawing Ref 26378)

210 Short Style Probe BOM (Figure 10)					
Item	Description	Part Number		Description	Part Number
1	O ring	37-0741-00	2	Temperature Actuator Spacer	36-1345-00
91	SS Valve Stem – A	On Request		SS Capture Tube - A	On Request
91	SS Valve Stem – B	On Request		SS Capture Tube - B	On Request
91	SS Valve Stem – C	On Request		SS Capture Tube – C	On Request
93	SS Support Tube – A	On Request		SS Sample Tube – A	On Request
93	SS Support Tube – B	On Request		SS Sample Tube – B	On Request
93	SS Support Tube – C	On Request		SS Sample Tube – C	On Request

Note Any corroded and worn parts and expendable items such as bolts and seals should be replaced with OEM (Original Equipment Manufacturer) spares of the correct specification. Part Numbers correct at time of print, Items may change, please consult Jiskoot Spares if in doubt

9 Installation Details

The Jiskoot™ 210 Probe Sampler is available in various configurations to mate with the pipeline flanged tapping of 2" or 3" ANSI 150# - 1500#RF / RTJ. The Short style is available in 3" ANSI 150# - 600#RF / RTJ) Each 210 Sampler is factory tested to full flange rating static pressure.

NOTE: As the Flange face and bolting PCD of an ANSI 300# variant is compatible with 600#, for 300# applications a 600# full rated device will be supplied.

To ensure the 210 Sampler probe head will pass though the pipeline tapping a full bore isolation valve is ideally used the tapping must be in line with the isolation valve and mounting flange having the following clear inside diameters:

3" Flange tapping must be a minimum of 56mm diameter,

2" Flange tapping must be a minimum of 50mm diameter.

The pipeline tapping is recommended to straddle the centre-line of the pipeline, with the 210 Sampler correctly positioned with the direction arrow of the sampler in line with flow.

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

The 210 Sampler (Not short Style) is designed to be used in conjunction with a Jiskoot™ '154' Series Hydraulic Extractor, to ensure safe installation or removal from a flooded or pressurised pipeline via a full bore ball valve fitted to the flanged tapping.

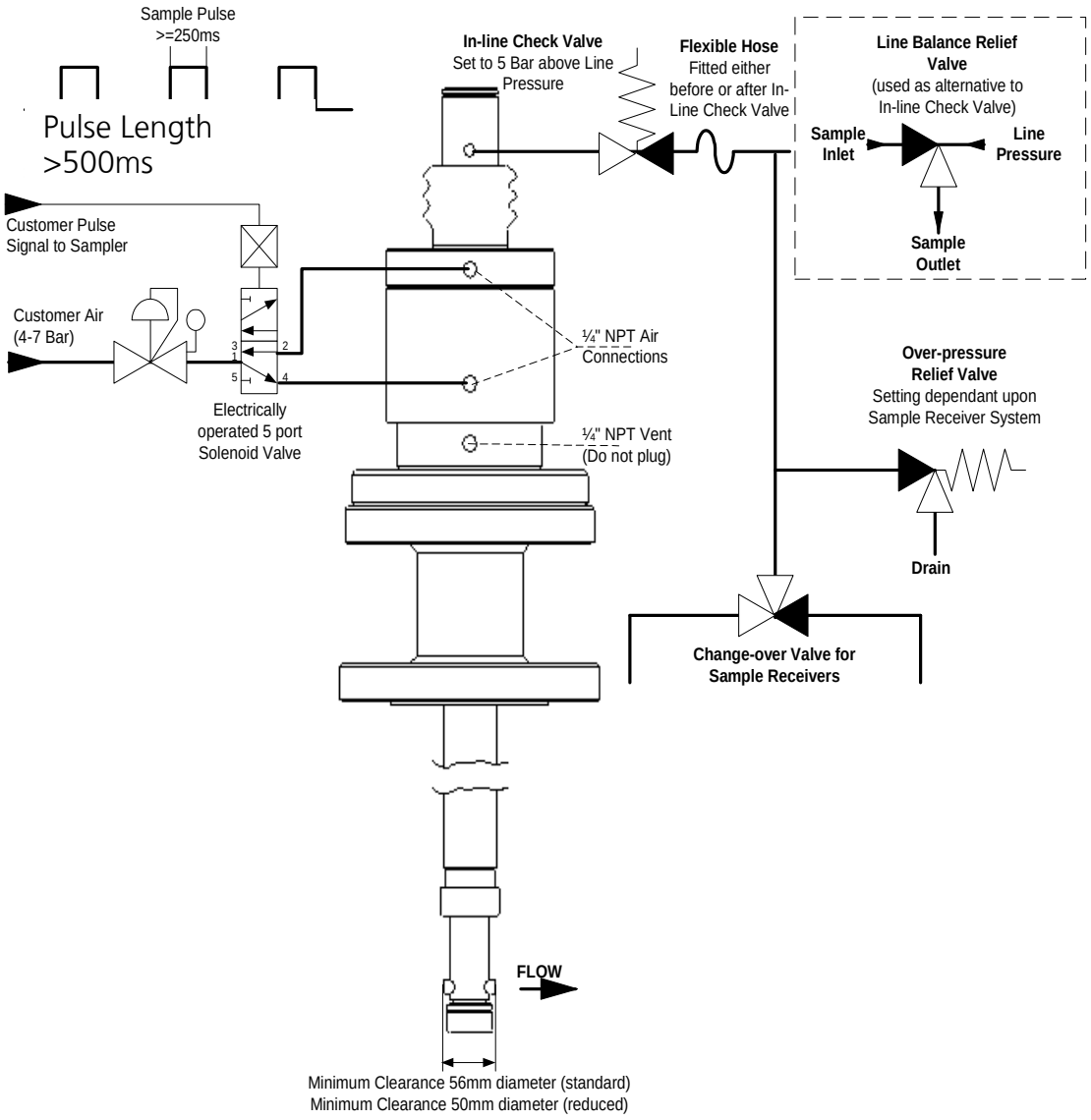


Figure 11 - Instrumentation

Generally the additional instrumentation required to operate a sampler will be part of the supply scope, if not a Sampler Solenoid Valve must be selected to suit the specific application and will require connecting to suitable supplies via glands and cables appropriate to the hazardous area classification.

A regulated filtered air supply must be connected to the Solenoid and the normally energised outlet connected to Port 'B' of the Sampler. The normally de-energised port of the Solenoid must be connected to Port 'A'. The exhaust port(s) of the Solenoid may be piped away or fitted with silencers as required. (On Electro-Hydraulic applications, the Solenoid is incorporated within the Hydraulic Power Pack.)

The 1/8"NPTF Sample Outlet Port located in the Sample Tube Head (Figure 3, Item 19) must be connected to the Sample Receiver System using ¼" or 6mm stainless steel flexible tubing rated to the full process pressure via either a Jiskoot™ in-line Check Valve or a Jiskoot™ Line Balanced Relief Valve together with a relief valve as shown in the above diagram. Note: In operation the sample head moves through about 12mm (1/2" on each cycle, the flexible tubing should be capable of repeat cycling and must be fitted to ensure that it does not cause stress to the sample head nor a tendency to loosen in operation.

NOTE: **The recommended Jiskoot external Check/Relief Valve must either be directly mounted to the Sample Tube Head with a flexible hose immediately after it, or connected to the Sampler via a flexible hose to allow for the movement of the top of the probe during operation.**

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 or line fluctuations. If the cracking pressure is set too low, the valve may open under adverse conditions, causing the Sample Receiver System to overfill with potential of leakage.

The Jiskoot™ 210 Sample Probe is not designed to internally maintain back pressure to prevent process leakage, and external fixed or balanced valve MUST always be employed. Consult factory for further information. In addition the 210 sampler is capable of providing outlet pressures significantly in excess of the process pressure if the outlet is blocked, therefore protection relief valve must always be fitted.

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 the Sample tube head is tight, after fitting any outlet connections

Ensure that lengths of tubing connecting the sampler 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 may contribute to premature seal wear). Ensure tubing travels downhill at a minimum angle of 15 degrees from the Sampler Outlet to the Receiver to avoid water traps. The sample outlet piping may require heat tracing to prevent blockage. In assembling the tubing or valve to the outlet of the sample head, take care that you do not loosen the assembly.

9.1 Sample Probe Installation

Notes: Do not attempt insertion or withdrawal of the Standard 210 or 210 SD Sample Probe without the optional 154 Series Hydraulic Extractor if the line pressure exceeds 2.5 Barg (40 psig). At this pressure, approximately 60KgF – 132 lbf will be produced at the probe head, as such it will not be possible to undertake the operation without risk of damage or injury to equipment or personnel.

The combined weight of the Sample Probe and the Hydraulic Extractor is approximately 65kg (145lb). Operators must ensure that adequate lifting equipment and safety precautions are used to avoid the risk of injury to personnel and damage to equipment whilst the Sample Probe is being installed or extracted.

Site location and access for Hydraulic Extractors in extended position should be considered together with additional scaffolding for slinging and supporting in both vertical and horizontal applications. See 9.1.2, page 18

9.1.1 Manual Installation of Sample Probe (Unpressurised Pipeline)

Installation of the Jiskoot™ 210 Sample Probe (All versions) should be carried out as follows:

If supplied - Remove the Weatherproof Housing and any ancillary equipment fitted to the Sample Probe detach the connections from the Actuator (pneumatic connectors are normally a push-to-release type or compression fittings) and disconnect the flexible hose from the Sampler Outlet.

The entire Weatherproof Housing may now be released loosening the clamp securing the mounting plate to the Support Tube Flange.

Remove the Cap head screws (Figure 3, Item 52) securing the Support Tube Flange to the Seal Housing.

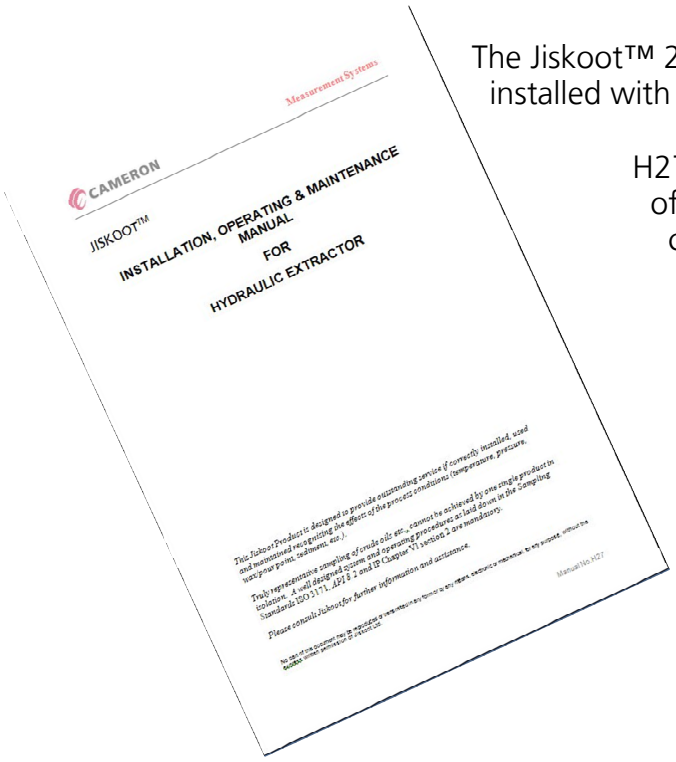
Move the Seal Housing down the Support Tube until the Probe Head is inside the Seal Housing.

Bolt the Sample Probe to the isolating valve using appropriate gaskets. Ensure that the bleed tappings on the Seal Housing are closed and that suitable ½" NPT plugs are fitted in place of any plastic shipping plugs.

Open the pipeline isolation valve. Push the Sample Probe through the valve and into the pipeline.

Refit and tighten the cap head screws to locate the Support Tube Flange to the Seal Housing, ensuring that the arrow in the top of the Support Tube Flange is aligned in the direction of the flow.

9.1.2 Installation of Sample Probe with HE1B and 154 Series Hydraulic Extractor



The Jiskoot™ 210 Sample Probe should be installed with reference to :

H27 Hydraulic Extractor Manual, steps of which are included below for clarity.

Figure 12 - Hydraulic Extractor

Follow the process above to prepare the probe for installation on the pipeline.

Due to the combined weight of the Sample Probe and Hydraulic Extractor, it is recommended that the Extractor be unbolted from the Probe when fitting the Sample Probe to the Isolating Valve.

Locate the Sampler on the Isolating Valve ensuring the flow direction arrow/mark on the Seal Housing is in the direction of flow.

Bolt the Sample Probe to the isolating valve using appropriate gaskets. Ensure that the bleed tappings on the Seal Housing are closed and that an isolation valve or suitable 1/4" NPT plugs are fitted in place of any plastic shipping plugs.

Ensure that the sample outlet isolation/back pressure/relief valve is fitted.

Once the sample probe is installed to the process isolation valve and all potential process interconnects are sealed correctly, fit the Hydraulic Extractor as detailed in H27 Hydraulic Extractor Manual to the Support Tube Flange and Seal Housing.

Refer to H27 Hydraulic Extractor Manual for detailed instruction and usage.

Fit the Jiskoot™ Hydraulic Extractor as detailed in **H27 Hydraulic Extractor Manual.**

Connect the high-pressure hose from the pump head end of the Hydraulic Pump to the quick release coupling piped from the bottom of the hydraulic rams, and the hose on the reservoir end of the Pump to the coupling for the top end of the rams.

1. Open the pipeline Isolation Valve
2. Select the '154' series diverter valve to apply pressure to the top of the hydraulic rams and apply one or two strokes of the Pump to push the Sample Probe towards the isolating valve and pipeline.
3. Pump the Sample Probe into the pipeline.
4. Once the Sample Probe has been fully inserted, replace and tighten the cap head screws which attach the support tube flange to the seal housing. The Hydraulic Extractor should now be removed.

Notes: **It is not recommended that the Hydraulic Extractor remain attached to the Sample Probe when installed in the line.**

9.2 Removing the Sample Probe

Notes: **Do not attempt insertion or withdrawal of the Standard 210 'SD' Sample Probe without the optional 154 Series Hydraulic Extractor if the line pressure exceeds 2.5 Barg (40 psig). At this pressure, approximately 60KgF – 132 lbf will be produced at the probe head, as such it will not be possible to undertake the operation without risk of damage or injury to equipment or personnel.**

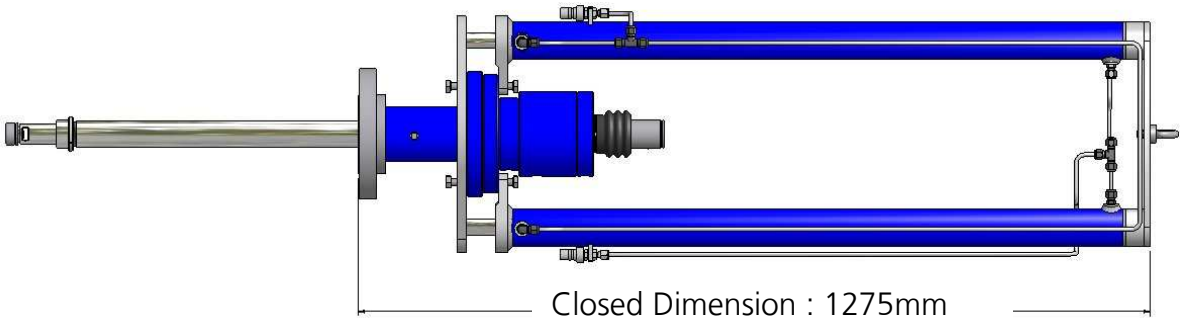
The combined weight of the Sample Probe and the Hydraulic Extractor is approximately 65kg (145lb). Operators must ensure that adequate lifting equipment and safety precautions are used to avoid the risk of injury to personnel and damage to equipment whilst the Sample Probe is being installed or extracted.

The procedure for withdrawing the Sample Probe from a pressurised pipeline is as follows:

1) Turn off any compressed air and electrical supply to the equipment.
2) Close all isolating valves on connections at line pressure. Any isolation valves fitted to the Sample Probe Head and Seal Housing must be closed.
3) Disconnect all lines to the Sample Probe - compressed air, hydraulic hoses and sample discharge line.
4) Remove the Sampler Weatherproof Housing (where fitted) complete with any insulation and ancillary equipment.
5) Fit the Hydraulic Extractor to the Sample Probe, as detailed in H27 Hydraulic Extractor Manual.

6) Connect the pump hoses to the Hydraulic Extractor via the quick connect couplings.

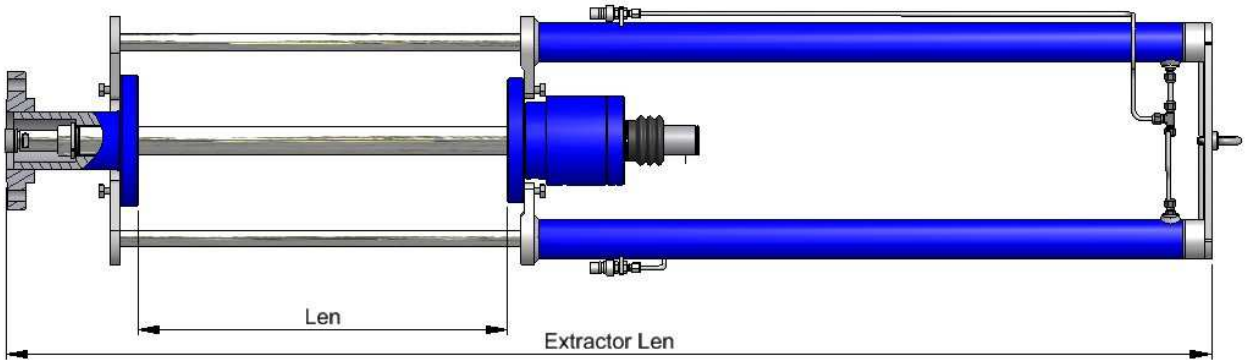
7) Select the '154' series diverter valve on the pump to apply pressure to the top of the hydraulic cylinders and pump until pressure is felt. This will ensure that the probe remains in contact with the seal housing as the seal housing fixing bolts are loosened and removed.



8) Remove the cap head screws (Figure 3, Item 52) completely.

9) The Probe has an engineered stop to limit its travel when fully withdrawn from the pipeline. However the user must check the length during extraction and not rely on the stop ring. Refer to table below.

Select the '154' series diverter valve on the hydraulic pump to apply pressure to the bottom of the hydraulic cylinders. Operate the pump to extract the probe out of the pipeline.



10) As the Sample Probe nears full extraction, check the length in anticipation of Extractor resistance due to reaching mechanical stop or failure of the 'Stop' ring, due to damage or loss.

Sampler Length	Stop Ring 'Len'	Extractor Len
A	563	1836
B	693	1966
C	868	2141

11) Close the pipeline isolating valve, depressurise and bleed the Seal Housing and disconnect the Hydrauic Extractor.

12) The probe may now be removed from the pipeline isolating valve.

9.3 Ancillary Equipment Installation (Weatherproof Housing)

The Ancillary Equipment, typically comprising Heater and Thermostat, Air Regulator, Solenoid Valve and External Check Valve, are mounted within an optional Weatherproof Housing.

Depending on the type of Sampler Weatherproof Housing; Insulated, pneumatic or hydraulic actuation, fit the clamp brackets or support plate to the Support Tube Flange.

Connect the two ports of the Actuator to the Solenoid Valve or Hydraulic Power Pack, ensuring that when de-energised, the Sample Probe is in "Open condition" (pressure is applied below the Actuator Piston, Port B).

Connect the outlet of the Sample Probe to the sample receiver.

Note: In order to prevent water drop out, the top of the Sample Receiver must be below the lowest level of the Sample Discharge from the Sampler and any ancillary equipment. The tubing must slope downwards at approximately 15o towards the Sample Receiver and be as straight and short as possible.

Heat-trace the tubing to 60°C in any installation where waxy or viscous crude oils are sampled. Use the following table as a guide to tubing size:

Sampler Tubing Length	Up to 200 cSt	Over 200 cSt
Up to 1.5m	1/4" O.D.	1/4" O.D.
1.5m to 3m	1/4" O.D	3/8" 0.D.
Over 3m	3/8" O.D.	1/2" O.D.

On air actuated versions, connect the air supply to the inlet port (1/4" NPT) of the pressure regulator.

On EH versions, connect the flexible hydraulic hoses to the Actuator (normally depressurised line to the upper port, Port A).

Connect cable(s) to the junction box through cable glands certified for use in the hazardous area classification. The wiring diagram for the ancillary equipment will be found in Section 9

Note: The correct rating fuse must be included in the Solenoid Valve supply circuit.

The bottom port (drain cavity) of the actuator may be connected to a closed drain or a pressure switch if required.

Fit the Weatherproof Housing (if supplied) in position. Slots or holes will have to be made to allow access into the housing for the Actuator supply piping, the Sample Outlet piping and electrical cables. The slots or holes should be made in the housing across the joint between its two halves. This will allow the housing to be completely removed without disconnecting piping or cables. The housing is attached by two M8 x 40 long bolts screwed into nuts attached to the upper bracket. To prevent ingress of water, seal all entries into the Housing using a suitable mastic.

9.4 Removal of Ancillary Equipment

Removal of the ancillary equipment is generally the reverse of the above.

10 Maintenance and Troubleshooting

10.1 Health and Safety Precautions

The Jiskoot™ Series 210 Sample Probe should only be overhauled by trained and competent personnel. Incorrect assembly of the sampler may result in premature component failure and loss of containment. Jiskoot can provide in-house or on-site courses to ensure that personnel have the necessary training to be able to safely and competently overhaul the equipment.

The Series 210 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 as the Sampler is stripped down.

10.2 Weekly Maintenance

External visual inspection of the Sampler, including connections, hoses and general condition (including corrosion) Regular maintenance is limited to draining excess moisture from the air filter/regulator or on EH applications, checking the level in the hydraulic oil reservoir on the Hydraulic Power Pack. If there is evident corrosion of bolts, the sampler must be immediately withdrawn from eth pipeline and serviced with corroded or failed parts replaced with factory supplier replacements.

10.3 Annual Maintenance (or less as determined by site conditions)

The Jiskoot™ Series 210 Probe Sampler is designed to operate continuously for a period of about 1,000,000 grabs 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 cannot 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. In any event, the Sampler should be overhauled at least every 12 months

The Sampler must be removed from the pipeline and taken to a clean area for servicing.

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.

A Special Tool Kit, Part Number 3J-45-0126-00, 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 Sampler

10.4 General Notes

These instructions apply to overhaul of the Hydraulic and High Pressure versions as well as the standard 210 air actuated Sampler. Variations are noted in the text of the relevant sections.

Any corroded and worn parts and expendable items such as bolts and seals should be replaced with OEM (Original equipment manufacturer) spares of the correct specification.

Hydraulically actuated (EH) Sampler Probes may be tested using compressed air or gas instead of hydraulic oil where this is more convenient.

The item numbers in brackets throughout the text relate to item numbers of components shown on the drawing referenced at the beginning of that section. To simplify the overhaul instructions, standard drawings and component numbers have been used throughout. Please note: Part Numbers for Hydraulic and High Pressure Sampler components may differ from standard. Refer to Section 11 for details of the spares kits and special tools required to overhaul all versions of the Sample Probe.

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

The complete overhaul should be carried out in the following order:

Step Description

1. Removal and overhaul of End Plug & Vacuum Breaker
2. Removal of Probe Head
3. Probe Head Slydring Replacement
4. Removal and overhaul of Seal Housing
5. Removal and overhaul of Check Valve Sub-Assembly
6. Removal of Sample Tube Head
7. Removal and overhaul of Actuator Assembly
8. Reassembly of Actuator Bottom Housing & Support Tube Assembly
9. Overhaul of Piston/Sample Tube Actuator/Lower Piston Rod Assembly
10. Reassembly of Piston/Sample Tube Actuator/Lower Piston Rod Assembly
11. Replacement of Piston/Catch Plate/Actuator Assembly
12. Replacement Seal Housing
13. Replacement Probe Head Assembly

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 or the Support Tube are damaged, leakage will occur from the seals.

Any corroded and worn parts and expendable items such as bolts and seals should be replaced with OEM (Original equipment manufacturer) spares of the correct specification.

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

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

10.5 Torque Settings:

Care should be taken not to over tighten screw fittings

The following torque settings should be used in the reassembly of the sampler:

Screw Location	Size	Torque
Bottom Actuator Housing (51) to Support Tube Flange (55)	M8 x 30mm cap head (Item 52)	25Nm/18.4lbfft
Lower Piston Rod to Capture Tube	Factory Assembled	75Nm/55.3lbfft
Sample Tube Actuator to Catchplate	M5 x 20mm cap head (Item 33)	10Nm/7.4lbfft
Actuator Top to Bottom Housing	Pre August 1992 M6 x 25mm cap head (Item 34)	15Nm/11.1lbfft
	Post August 1992 M8 x 35mm cap head (Item 34)	25Nm/18.4lbfft
Support Tube Flange to Seal Housing	Pre April 2006 M10 x 40mm cap head (Item 51)	40Nm/29.5lbfft
	Post April 2006 M12 x 35mm cap head (Item 51)	50Nm/37lbfft
Sample Tube Head to Sample Tube Actuator		60Nm/44.5lbfft

10.6 Overhaul of Series 210 Sampler

10.6.1 Removal & Overhaul of End Plug & Vacuum Breaker

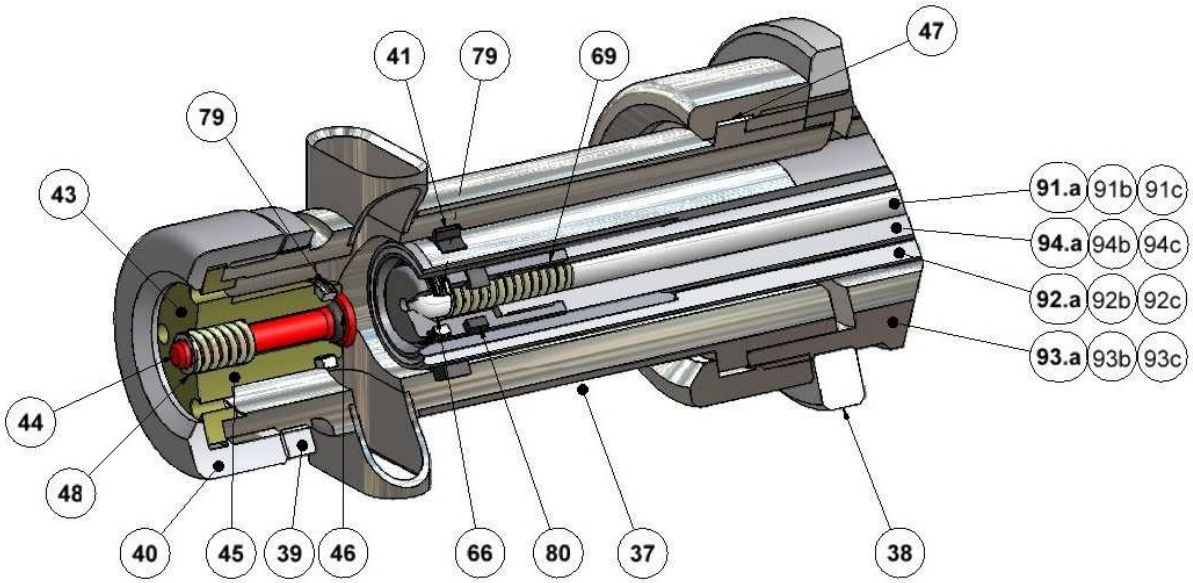


Figure 13– 210 Probe Head

Loosen the Lock Ring (Figure 13, item 39) using 36-2000 Series 'C' Spanner

Loosen and remove the Lock Nut (Figure 13, item 40) using 36-2000 Series 'C' Spanner

Withdraw the End Plug (Figure 13, item 43) from the Probe Head.

Remove the Balseal (Figure 13, item 79) taking care not to damage the machined surfaces. Examine seal area of End Plug for wear (scoring), discard and replace if necessary.

Remove the Fastener (Figure 14, item 48) from the stem of the Vacuum Breaker Valve and discard.

Remove the Spring (Figure 13, item 45) from the End Plug.

Remove the 'O' Ring (Figure 13, item 46) from the Vacuum Breaker (Note There is no "O" ring on Probes after Oct 2012) Valve taking care not to damage the machined surfaces. Examine seal area of Vacuum Breaker for wear (scoring), discard and replace if necessary.

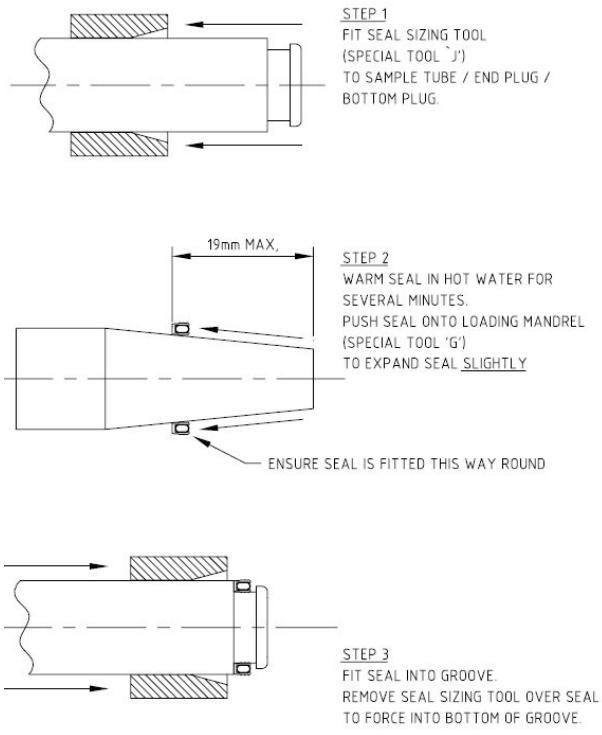


Figure 14 – Vacuum Breaker Fastener

Reference Figure 13, Re-assemble using new Spring (Figure 13, item 45). Ensure the New Fastener (Figure 14, item 48) is assembled to the stem of the Valve as per illustration Figure 14 and engages in the retaining groove.

Warm the Balseal (Figure 15, item 79) in hot water. Place the Balseal over the Balseal Loading Mandrel, Special Tool 'G' and push down approximately half the mandrel's length to expand the lip seal so it will fit over the End Plug (Figure 13, item 43).

Figure 15 – Balseal Fitting Tool

Remove Balseal from Mandrel and fit to End Plug ensuring the Balseal is fitted with the Spring toward the head of the End Plug.

Using fingers, reform the Balseal into the groove and then place Balseal Assembly Tool, Special Tool 'J' over the End Plug (tapered end first) to set the Balseal to the required size. Leave for 3-5 minutes.

Remove Balseal Sizing Tool and check Balseal for damage.

If not proceeding further with the overhaul, replace the Vacuum Breaker and End Plug Assembly in the reverse order of the above, else set aside until required.

10.6.2 Removal of Probe Head

Reference Figure 13

Loosen the Lock Ring (item 38) using 'C' Spanner, Special Tool 'A'.

Loosen the Probe Head Lock Nut using 36-2000 Series 'C' Spanner and unscrew the Lock Nut from the Support Tube.

Withdraw the Probe Head (item 37) from the Support Tube and remove Lock Nut (item 38).

10.6.3 Slydring (41) Replacement

Remove the Slydring (item 41) from inside the Probe Head (item 37).

Fit the new Slydring inside the Probe Head by slightly overlapping the ends of the Slydring, placing the Slydring in the core of the Probe Head and then pushing it into position in the groove. Once in position, the Slydring is expanded so that the ends no longer overlap.

Re-fit the End Plug (item 43) into the Probe Head. Tighten Lock Nut (item 40) and back down Lock Ring (item 39) to secure.

If not proceeding further with the overhaul, re-fit the Probe Head to the Support Tube ensuring the Roll Pin (item 47) fitted to the Probe Head engages with the corresponding notch in the Support Tube. Ensure the Probe Head Lock Nut and Lock Ring (item 38) are securely tightened.

If proceeding with overhaul, place sub-assembly to one side.

10.6.4 Removal & Overhaul of Seal Housing (Post April 2006)

Remove the Probe Head Assembly as described in section 10.6.2

Grease the threaded end of the Support Tube. *Note*: Short Style Samplers do not have a Seal Housing, (See Figure 10) but have an adapter Flange fitted below the Support Tube Flange, removed the probe head and Flange replacing 'O' Ring (Figure 10, item 1) and provide access to the Actuator Retaining Bolts.

Remove the cap head screws that attach the Support Tube Flange to the Seal Housing (Figure 3, item 1, 52 and 55).

Withdraw the Seal Housing from the Support Tube.

Using a pick from the toolkit-or small screwdriver, release and remove the Smalley Ring (Figure 16, Item 93 and 2)

Remove the Seal and the Seal Backing Ring (Figure 16. Item 4 and 4a).

Fit the new Seal orientation as shown.

Re-fit the Seal Backing Ring and the Smalley Ring, tapping to ensure that it is firmly engaged.

Note: The Smalley Ring will not rotate when correctly fitted in the groove

If proceeding with overhaul, place sub-assembly to one side.

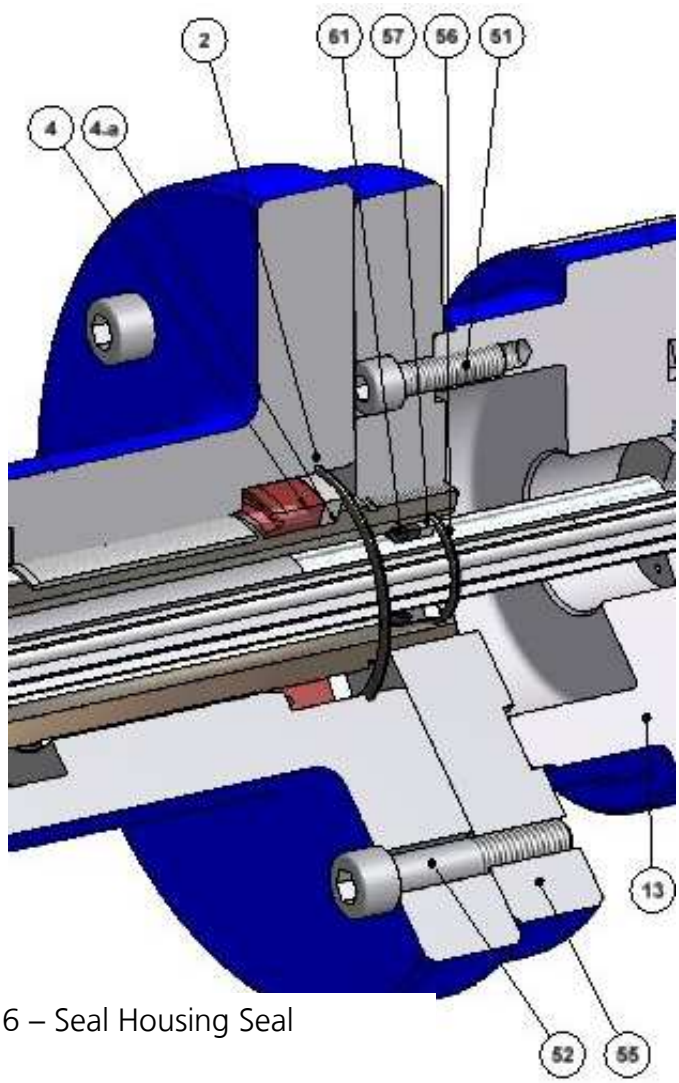


Figure 16 – Seal Housing Seal

10.6.5 Removal & Overhaul of Seal Housing (Pre April 2006)

Remove the Probe Head Assembly as described in section 10.6.2 Grease the threaded end of the Support Tube.

Note: Shipboard Samplers do not have a Seal Housing, (General Assembly & Bill Of Material 210 SHORT STYLE, Page 13) but have an adapter Flange fitted below the Support Tube Flange, removed the probe head and Flange replacing 'O' Ring (Fig 10 Ref item 1) and provide access to the Actuator Retaining Bolts.

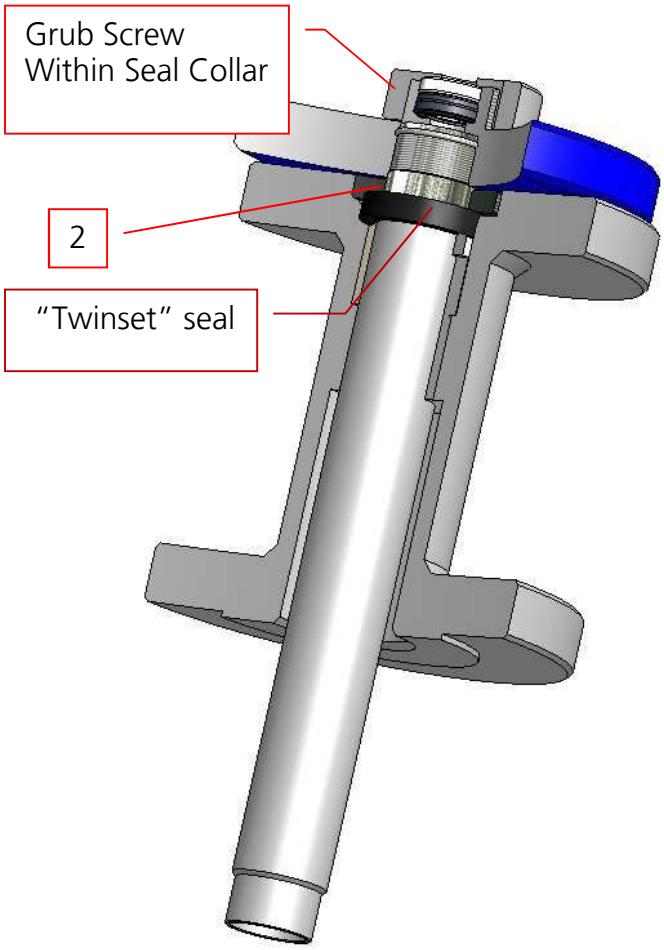
Probe overhaul continued...

Clamping the Seal housing in a suitably protected vice, remove the cap head screws attaching the Support Tube Flange to the Seal Housing (Figure 3, items 1, 52 and 55).

Note: HP Samplers prior to April 2006 use 3 off M12 x 70mm Hexagonal Head Set Screws.

Supporting the weight of the Probe, withdraw the complete assembly from Seal Housing.

Refer to Seal location and instruction provided within replacement seal kit, ref 29174 On Probes pre 06, Unscrew the grub screw within the Seal Collar, unscrew the Seal Collar using Peg Spanner and remove the Seal



Pre -06 Sample Probes utilised a two part "Twinset" seal, this was revised on Sample Probes post -06 to a single "O" ring energised seal as direct replacement

Note : When replacing the "Twinset" seal with a single "O" ring energised seal, the nylon former should also be discarded.

Fit the new Seal with shaped sealing ring toward the bottom of the seal recess.

Please note: When pressurised, the new seal will lift and come to rest against the Seal housing seal collar (Figure 3, item 2) the void below will be filled with process fluid.

Re-fit and tighten the Seal Collar, using a Peg Spanner, Special Tool 'B'.

Figure 17 – Pre 2006 Probe

If proceeding with overhaul, place sub-assembly to one side.

10.6.6 Removal & Overhaul of Check Valve Sub-Assembly

Screw 1/8" NPT Tommy Bar, Special Tool 'D', into the Sample Tube Head (Fig. 17 – item 19), ensuring the tool is fully tightened.

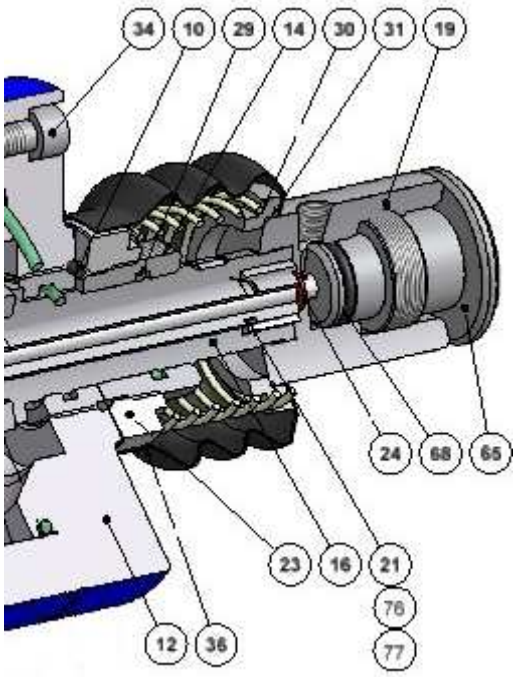


Figure 18 – Check valve Sub Assembly

Hold the Tommy Bar and unscrew the Check Valve Nut (Figure 18– item 65) using Check Valve Peg Spanner, Special Tool 'E', and Tommy Bar, Special Tool 'F'.

Withdraw the Check Valve Assembly from the Sample Probe.

Remove the Valve Stem along with the Check Valve Tip and Spring (Figure 13, Items 66, 69 and 91).

Check straightness and fit the new Spring and Check Valve Tip to valve stem.

Replace the 'O' Ring fitted to the Check Valve Nut (Figure 18, item 65 and 68).

If proceeding with overhaul, place sub-assembly to one side.

10.6.7 Removal of Sample Tube Head

Remove the Gaiter to expose the machined flats on the Sample Tube Actuator through the Spring.

If not previously fitted, screw 1/8" NPT Tommy Bar, Special Tool 'D', into the Sample Tube Head (Figure 19), ensuring it is fully tightened.

Figure 19– Sample Tube Head

Hold the Sample Tube Actuator with a 19mm A/F open-ended spanner on the flats, and loosen the Sample Tube Head by gently tapping the Tommy Bar with a soft-faced hammer. The Sample Tube Head unscrews in an anti-clockwise direction when viewed from above.

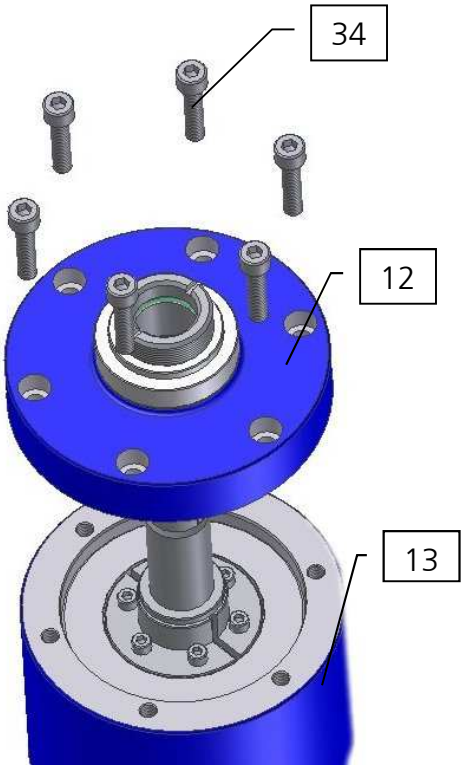
Remove the Sample Tube Head Sealing Washer, Spring and Split Collar. (Figure 18, item's 19, 24, 30 and 31)

Place components to one side.

10.6.8 Removal & Overhaul of Actuator

Remove the 6 off M8 screws retaining the Top Housing to the Bottom Housing (Figure 20, items 34, 12 and 13Fig.19 Item 13).

NOTE: Prior to August 1992, Item 34 was M6.



Fit a suitable 1/8"NPT Fitting into the port 'A' (Figure 20, item 12) in the Top Housing. Using a twisting and pulling motion, remove the Top Housing, complete assembly.

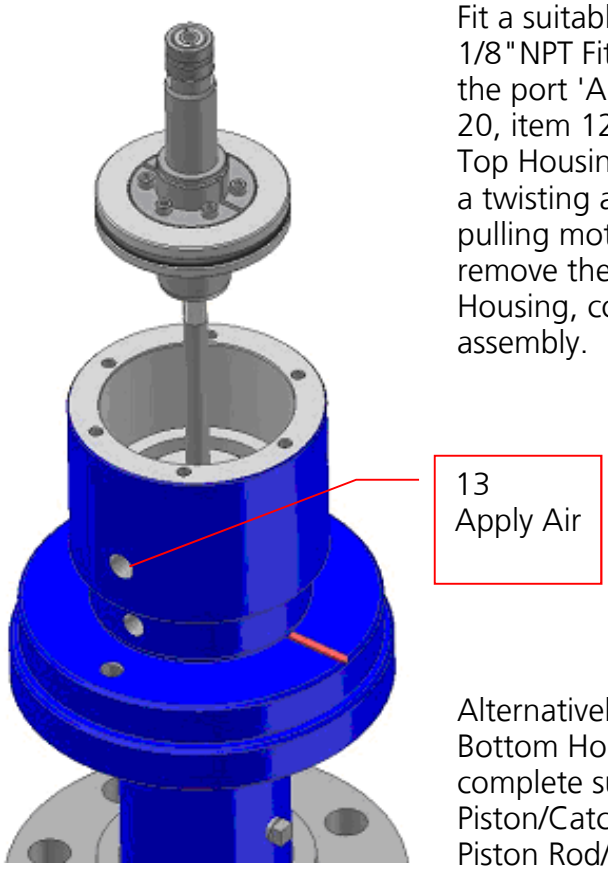


Figure 20 – Overhaul of Actuator

Alternatively, apply slight air pressure to Port B in the Bottom Housing (Figure 21), and withdraw the complete sub-assembly comprising Piston/Catchplate/Sample Tube Actuator/Lower Piston Rod/Sample Tube/Capture Tube.

Figure 21 – Sub-assembly comprising Piston/Catchplate/Sample Tube

Note the location of the ports in the Bottom Housing in relation to the Support Tube Flange. Unscrew the 6 off M8 x 30mm cap head screws locating the Bottom Housing to the Support Tube Flange and remove the Bottom Housing

(Figure 22, Item's 51, 55 and 13)

With the Actuator housing removed, remove the Smalley Ring, Anti-extrusion Ring and the seal (Figure 22– Item's 56,57 and 61) Using a pick from the toolkit or a small screwdriver.

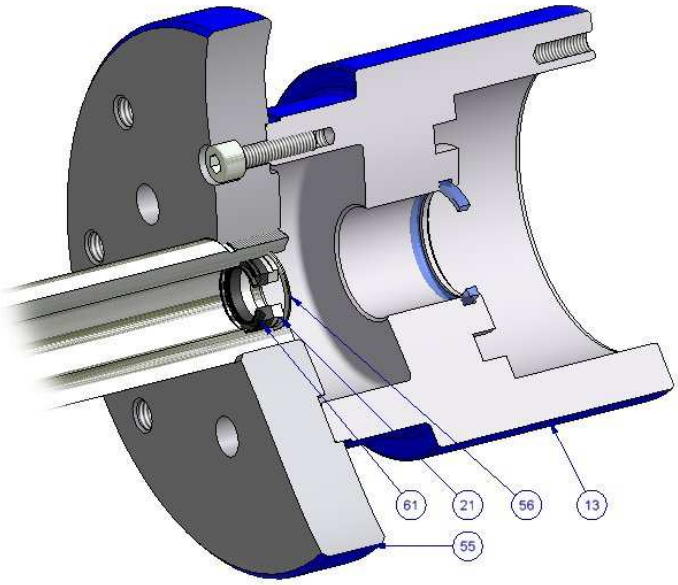


Figure 22 – Actuator Flange Removal

Note:
On samplers supplied before Serial Number 2006F****, Ref . The Balseal is retained by Seal Nut , which required 36-2000 series 'C' Spanner

10.6.9 Reassembly of Actuator Bottom Housing & Support Tube Assembly

Note:
All components must be thoroughly cleaned and lightly greased on reassembly.

Inspect Support Tube (Figure 4, Item 93) for scoring and ensure Tube is straight. If in doubt, consult Jiskoot for replacement Support Tube/Support Tube Flange sub-assembly.

Using the Upper Capture Tube Seal Assembly Tool : Jiskoot tool Kit :Tool 'M', fit the new Balseal (Figure 22– Item 61) with the Seal Spring facing towards the bottom of the seal recess in the Support Tube (as illustrated in Figure 22).

Refit the Anti-extrusion Ring and Smalley Ring (Figure 22– Item's 56 and 57). On samplers supplied before Serial Number 2006F****, the Balseal (ref Figure 17, page 29) is retained by Seal Nut, which requires 'C' Spanner, Special Tool 'A' to tighten it.

Clean and examine the bore of Actuator Bottom Housing (Figure 22– Item 13) for wear, fit new Quadring Seal (Figure 3– Item 28).

Note: From 1999, Item 28 on all variants of the 210 Sampler was replaced by a Quadring Seal, Part No. 37-0554-00. This Seal is fully interchangeable with all options previously supplied.

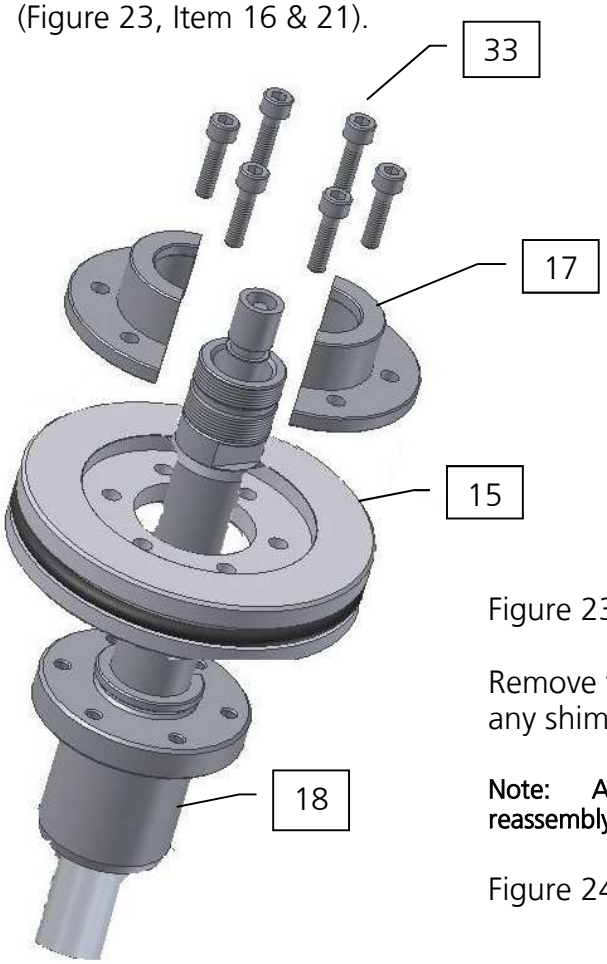
Replace Bottom Housing on the Support Tube Flange, ensuring orientation of ports is as found.

Tighten M8 x 30mm screws to specified torque (Section 0 page 25).

10.6.10 Overhaul of Piston/Sample Tube Actuator/Lower Piston Rod Assembly

Hold the assembly by the Lower Piston Rod, **taking care to protect its surface**.

Pull the Sample Tube Actuator up to the top of its stroke, and then push the Sample Tube Actuator back down to expose the Split Collet (Figure 23, Item 16 & 21).



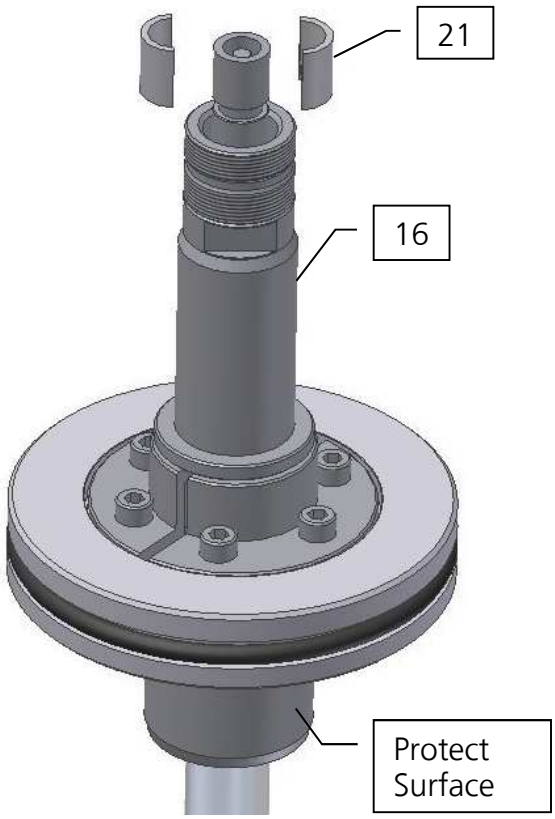


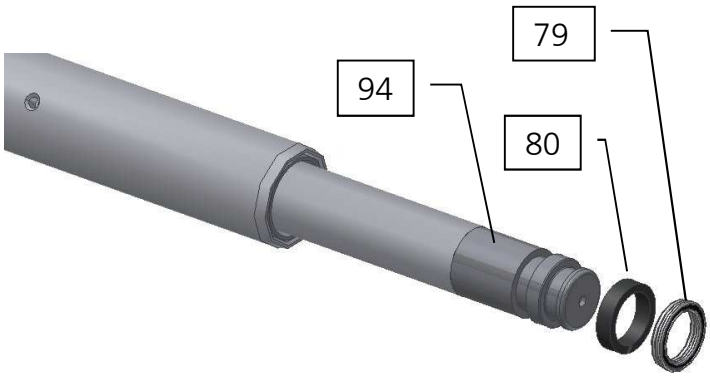
Figure 23 - Lower Piston Rod Assembly

Remove the two halves of the Split Collet, and any shims that may be exposed.

Note: All shims are unique and must be replaced on reassembly.

Figure 24 – Lower Piston Rod

Unscrew the 6 off M5 x 20mm cap head screws (Figure 24– Item 33), Note on HP units the cap head screws are M5 x 25mm



Remove the Catchplate and Actuator from the Piston (Figure 24– Item's 17, 16 and 15).

Remove Piston from Lower Piston Rod and Sample Tube Actuator .

Figure 25 - Capture Tube Assembly

Push the top end of the Sample Tube (Figure 25– Item 94) down and remove the Sample Tube Balseal and Slydring (Figure 25– Item's 79 and 80).

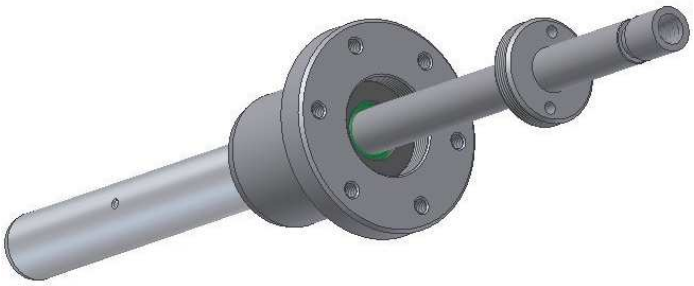


Figure 26 – Sample Tube Nut

Unscrew and remove the Lower Piston Rod Seal Nut (Figure 26) using Lower Piston Rod Seal Nut Peg Spanner - Tool 'E'.

Continue pulling the Sample Tube down through the Capture Tube and then push back up, to remove the Balseal, Seal Ring, Seal Ring "O" Ring and Quadring (Figure 27– Item's 32,26,22 and 25).

Figure 27 – Sample tube Seal

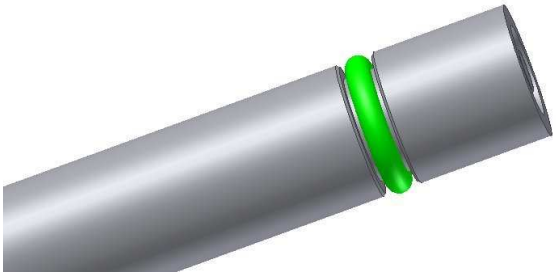
Do not remove the Capture Tube from the Lower Piston Rod (Figure 27, item 20).

Note: If the Capture Tube is to be replaced, a complete sub-assembly including the Lower Piston Rod must be obtained from Jiskoot.

Clean all components and inspect for wear and straightness. Any components with scoring in the seal area must be replaced.

10.6.11 Reassembly of Piston/Sample Tube Actuator/Lower Piston Rod Assembly

Note: All components must be thoroughly cleaned and lightly greased on reassembly.



To assist the re-fitting of the Balseal (Figure 27, item 32), fit the 'O' Ring (Jiskoot Ref. 37-0709-00) supplied in the Spares Kit, to the split collet groove of the Sample Tube as illustrated (Figure 28).

Figure 28 – Assembly Aid

Fit the Sample Tube Seal (Figure 27, Item 32) over the end of the Sample Tube, with the spring facing the check valve end of the tube. Push the seal carefully over the "O" ring covered split collet groove, for approximately 50mm.

Insert Sample Tube into the Lower Piston Rod/Capture Tube Assembly.

Figure 29 – Refit Sample Tube Seal

Fit the Sample Tube Seal into the bore of the Lower Piston Rod using Upper Sample Tube Seal Assembly Tool, Special Tool 'L'.

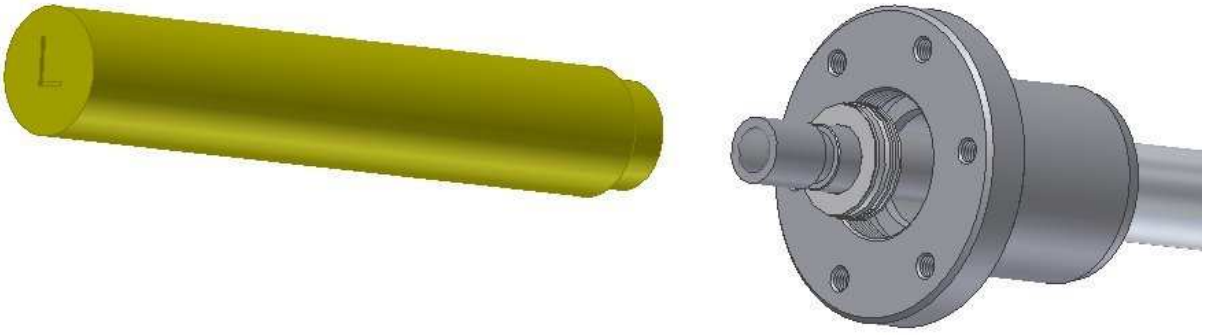


Figure 30 – Sample Tube Seal

Push the Sample Tube down through the Capture Tube to expose the Slydring and seal grooves, ensuring the Sample Tube "Groove" remains above the seal (Figure 31).

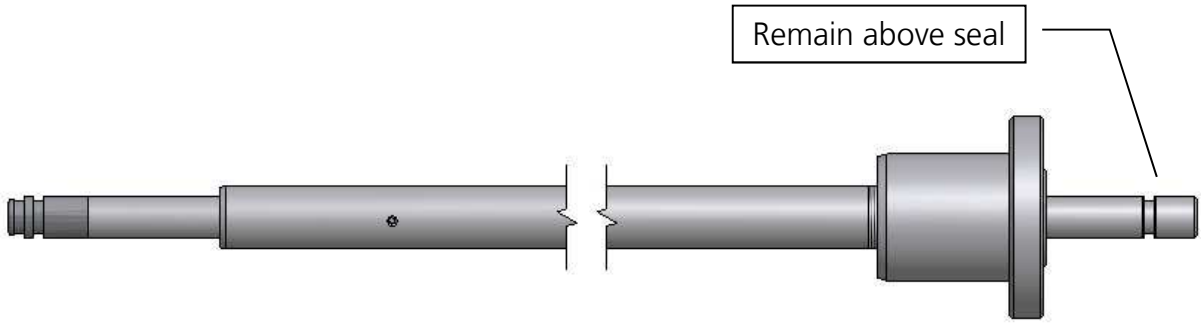


Figure 31 – Replacement Sample Tube Seal

Remove the 'O' Ring fitted to the split collet groove and discard.

Fit new 'O' Ring (Figure 32, item 104) into the seal ring recess of the Lower Piston Rod, using an inverted Seal Ring (Figure 32, item 22) to push it into the undercut at the bottom of the thread.

Fit new Seal Ring (Figure 32, item 22) and push fully home.

Note: From 1999, Item 25 on all variants of the 210 Sampler was replaced by a Quadring, Part No. 37-0551-00. This Seal is fully interchangeable with all options previously supplied.

Fit Quadring (Figure 32, item 25), and push fully home using Upper Sample Tube Seal Assembly Tool, Special Tool 'L'.

Fit Seal Nut (Figure 32, item 20) and fully tighten using Lower Piston Rod Peg Spanner, Special Tool 'E'.

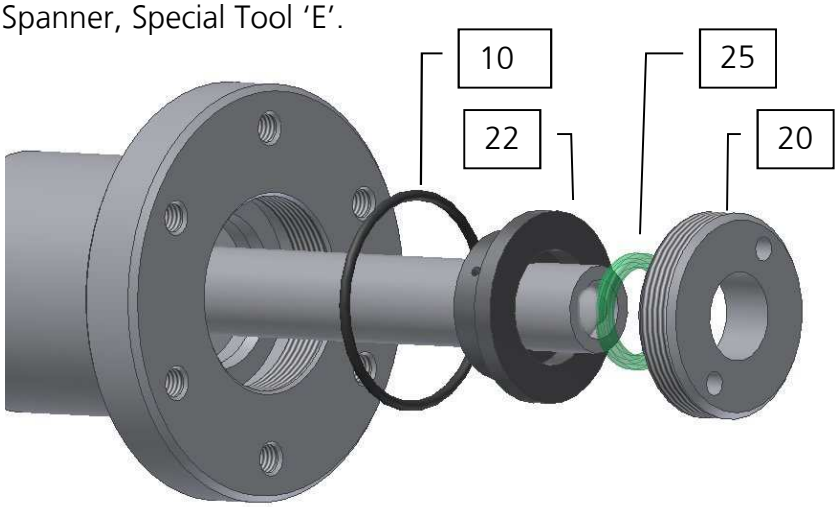


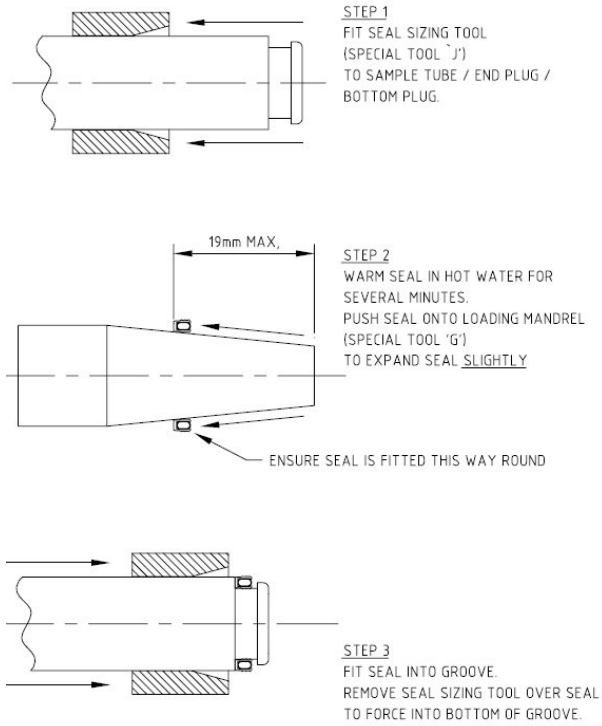
Figure 32 – Lower Piston Rod Seal Replacement

Form the new Sample Tube Slydring (Figure 25, page 34, Item 80) by wrapping it round its groove in the Sample Tube until it's diagonally cut ends meet.

Push Slydring into the groove in the bore of the Capture Tube.

Fit the new Balseal (79) to the Sample Tube. Ensure the Seal is fitted to the Sample Tube with the spring facing towards the end of the Sample Tube.

Warm the Balseal (Figure 25, page 34 Item 79) in hot water. Place the Balseal over the Balseal Loading Mandrel, Special Tool 'G' and push down approximately half the mandrel's length to expand the lip seal so it will fit over the Sample Tube (Figure 25, page 34, item 94).



Remove Seal from Mandrel and fit to Sample Tube ensuring the Balseal is fitted with the spring facing to check valve end of tube.

Figure 33 – Balseal Forming Tool

Using fingers, reform the Balseal into the groove and then place Balseal Assembly Tool, Special Tool 'J' (Figure 33) over the End Plug (tapered end first) to set the Balseal to the required size. Leave for 3-5 minutes.

Remove Balseal Sizing Tool and check Balseal for damage.

Using a suitable rod of soft material, e.g. Delrin, push the Sample Tube into the bore of Capture Tube until end of Sample Tube is 20mm (3/4") inside the Tube (Figure 34).

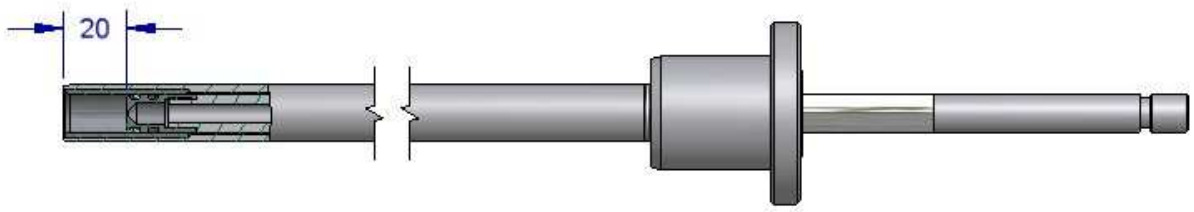


Figure 34 – Sample Tube Slydring

Note: Do not push any further or Slydring will jam in end of Capture Tube bore.

10.6.12 Replacement of Piston/Catch Plate/Actuator Assembly

Re-fit Piston to Lower Piston Rod, ensuring Piston is correct way round (Figure 35) 1mm offset when assembled.

Fit new 'O' Ring (Figure 3, item 11) to bore of the Sample Tube Actuator (Figure 36).

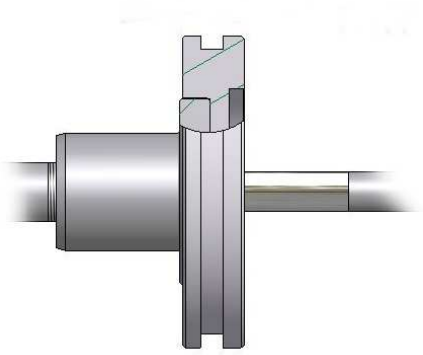


Figure 35 – Piston assembly

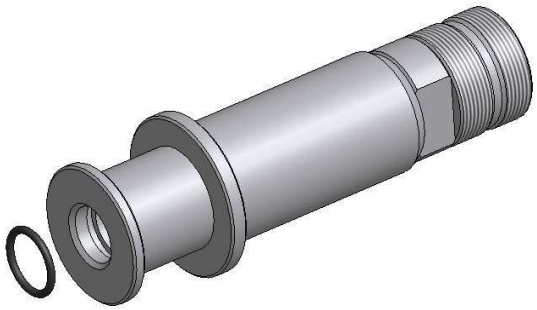


Figure 36 – Sample Tube Actuator

Fit Sample Tube Actuator and Catchplate Assembly over the Sample Tube and attach to the Piston/Lower Piston Rod Assembly using the six new M5 x 20mm cap head screws supplied in the Spares Kit, ensuring Sample Tube Actuator is retained by the Catchplate.

Note: Care must be taken when pushing the Sample Tube Actuator over the Sample Tube that the Sample Tube is not pushed back down the Capture Tube.

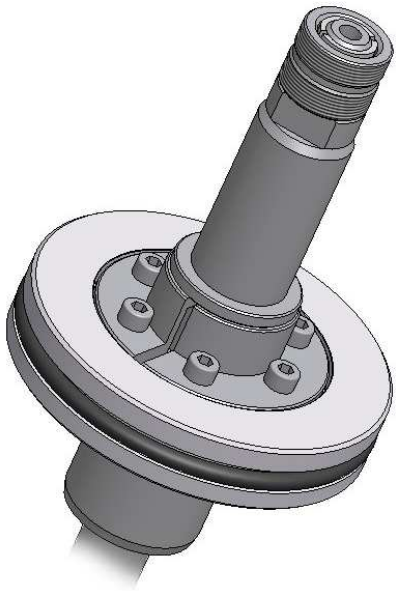
Figure 37 – Re-assembly Sample tube Actuator

Tighten M5 x 20mm cap head screws to specified torque setting
(Section 0, Page 25).

Note: HP Samplers use M5 x 25mm cap head screws.

Re-fit the two halves of the Split Collet to the Sample Tube (Figure 23). ENSURE ALL ORIGINAL SHIMS (76 & 78) ARE REFITTED UNDER SPLIT COLLET. As this will result in damage when the Sampler is operated

Push the Split Collet down into the recess in the top of the Sample Tube Actuator and Fit new 'O' Ring to Piston (Figure 38).



Note: **EH Samplers have two 'O' Rings fitted to the Piston and a Liner fitted to the Actuator Bore, sealed by an 'O' Ring (Figure 6,Page 6, items 96, 95 and 97).**

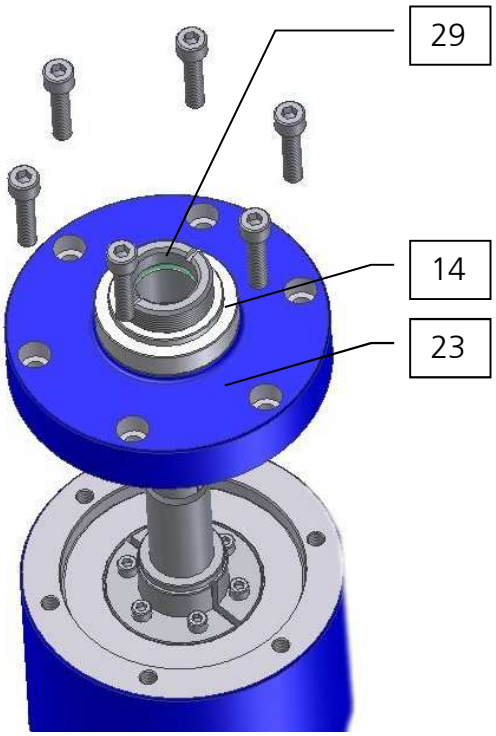
Figure 38 – Assembled Capture Tube

Liberally grease the bore of the Bottom Housing (13) and the Capture Tube/Piston Assembly.

Slide the assembly through the Bottom Housing into the Support Tube Balseal Carefully push through the Balseal and slide assembly fully home into the Bottom Housing. (Reference Figure 22)

10.6.13 Refitting of Top Housing

Note: **Avoid disturbing the Lock Ring (23) on top of the Actuator (Unless leaking). If the Sealing Bush (14) is moved, the grab size of the Sampler will be altered.**



Fit 2 off 'O' Rings in the bore of the Sealing Bush (Figure 39, Items 29 &14).

Fit 'O' Ring in the Top Housing (Figure 3, items 26 & 12).

Liberally grease the internal surface of the Sealing Bush (14), the outside of the Sample Tube Actuator (16) and the internal bore of the Top and Bottom Housings (Figure 3).

Slide the Top Housing over the Sample Tube Actuator and push the two halves of the housing together.

Rotate the Top Housing to align the Actuator Ports.

Fit 6 off M8 x 35mm cap head screws and tighten to specified torque (Section0, page25).

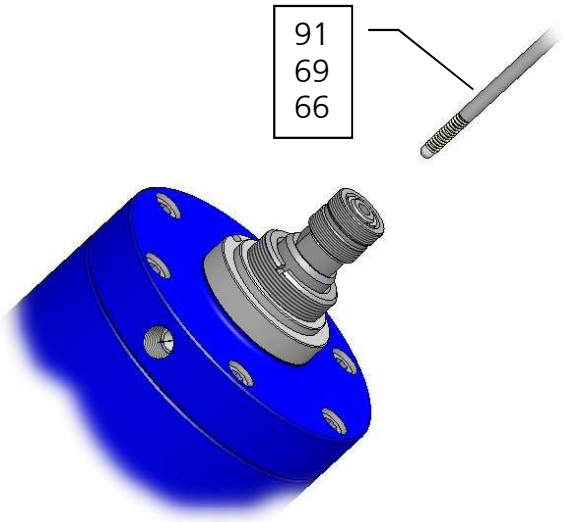


Figure 39 – Refitting of Top Housing

Apply slight air pressure to Port B in the Bottom Housing to move the Piston assembly upwards, whilst holding the Sample Tube down in the Sample Tube Actuator to prevent it moving independently of the Sample Tube Actuator.

Fit Check Valve Stem (91), complete with Spring (69) and Check Valve Tip (66), into Sample Tube (Figure 39).

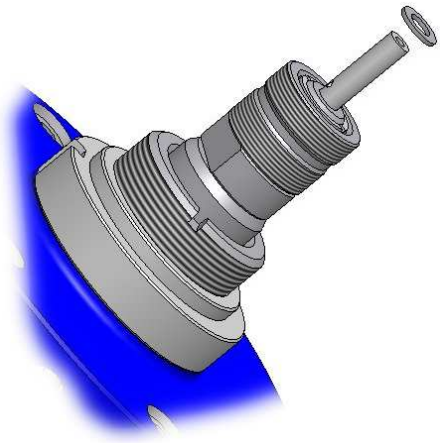


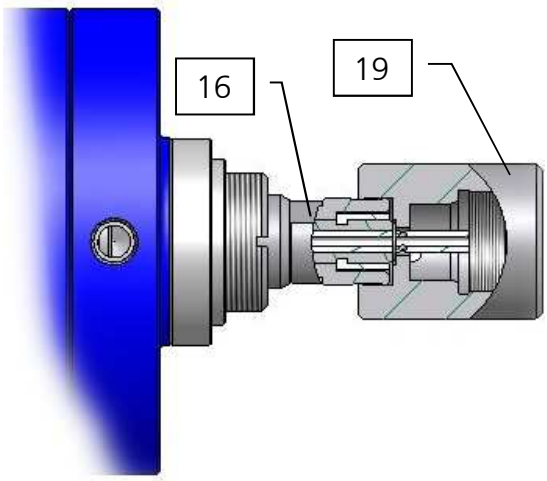
Figure 40 – Replace Check valve.

Place new M6 Washer (24) on top of Sample Tube Actuator. (

Figure 41)

Figure 41 – Sealing Washer

Screw Sample Tube Head (Figure 42, item 19) onto Sample Tube Actuator and ensure Check Valve Stem moves freely before tightening Sample Tube Head.
Using a 19mm A/F open ended spanner to hold the Sample Tube Actuator (Figure 19, page 30) and tighten the Sample Tube Head by tapping the 1/8" NPT Tommy Bar, Special Tool 'D', previously fitted to the port, using a soft-faced hammer (Figure 42).



Note: This is a pressure retaining joint and must be tight – refer to (Section 0, page 25) torque settings.

Fit new 'O' Ring (68) to the Check Valve Nut (65) Figure 43.

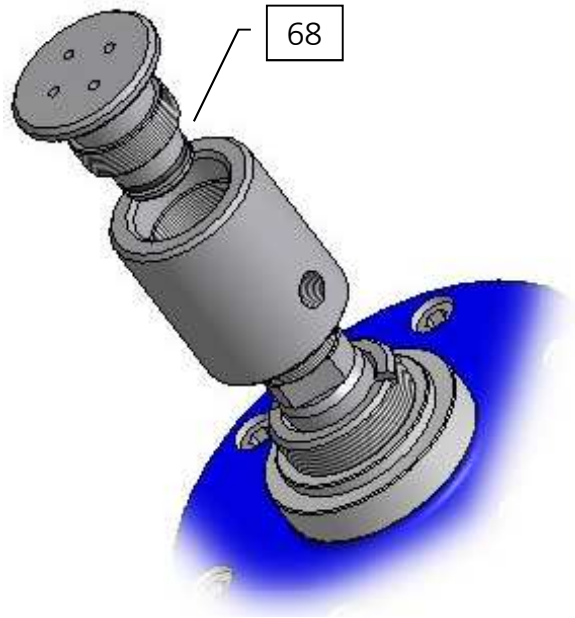


Figure 43 – Check valve Nut

Screw the Check Valve Nut into Sample Tube Head and tighten using Check Valve Nut Peg Spanner - Tool 'E' and Tommy Bar, Tool 'F'.
(Figure 43)

Figure 42 – Sample Tube Head

Fit replacement Spring (30), and assemble Split Collet (31) under the Sample Tube Head.
Fit new Gaiter over the assembly and secure with a cable tie (Figure 44).

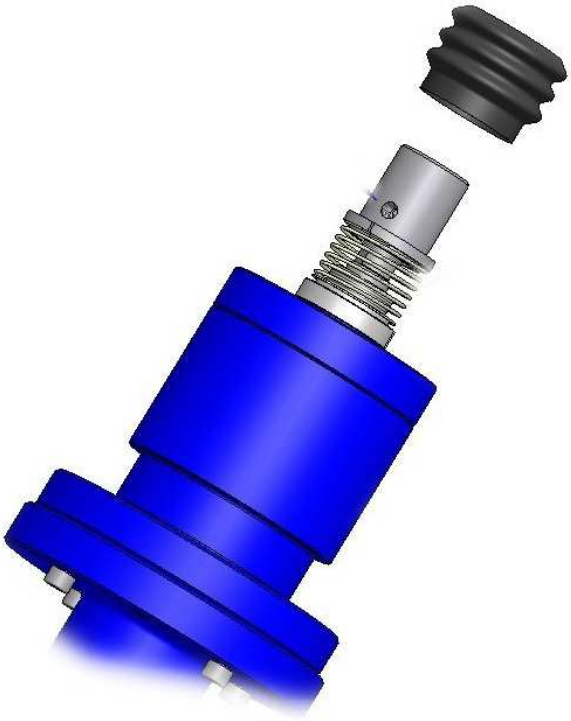


Figure 44 – Sample Head Spring

10.6.14 Replacement of Seal Housing

Grease the Support Tube.

Figure 45 – Support Tube Assembly

Note: 'SD' Short Style Samplers do not have a Seal Housing, but have an Adapter fitted to the Support Tube Flange, which should be refitted at this stage using a new 'O' Ring, Part Number 37-0009-00.

Holding the Seal Housing in a vice, and ensuring the Sampler Assembly is adequately supported so as not to bend the Support Tube or damage any components, carefully insert the Support Tube with aid of special tool 37-0795-MC through the Seal in the

Seal Housing so as to leave a 25mm (1") gap between the Seal Housing and the Support Tube Flange.

Attach the Support Tube Flange to the Seal Housing ensuring the flow arrow or groove on the Support Tube Flange is aligned with the ¼" NPT tapping in the Seal Housing.

Secure the Support Tube Flange to the Seal Housing, using 4 off M12 x 40mm cap head screws, tightened to the specified torque (Section0, page25).

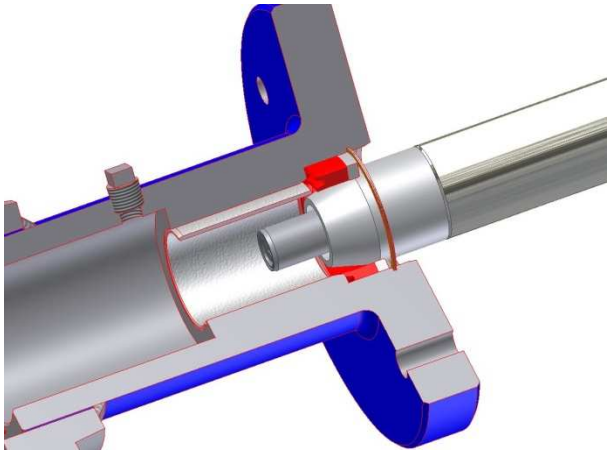


Figure 46 – Support Tube Assembly Tool

10.6.15 Replacement of Probe Head

Fully screw Lock Ring (Figure 4, item 38, page 6) onto Support Tube (93).

Refit the Probe Head Assembly to the Support Tube (93), ensuring Pin (47) aligns with notch in Support Tube.

Fully tighten Probe Head (37) and Lock Ring (38) using C Spanner, Tool 'A'.

Screw Lock Ring (38) down onto Lock Nut (40) and tighten using 36-2000 Series 'C' Spanner

Push End Plug/Vacuum Breaker Assembly into the Probe Head, and secure with Lock Nut (40). Tighten using C Spanner, Tool 'A'.

Screw Lock Ring (38) down onto Lock Nut (40) and tighten 36-2000 Series 'C' Spanner

11 Testing

It is recommended that where a test facility is available, the Sampler is pressure tested and re-calibrated prior to returning to service.

11.1 Witness testing prior to re-installing the Sampler in service.

In the absence of a test facility, the Sampler sealing and grab integrity may require witness testing after service and prior to re-installation.

Ensure the external check valve has been serviced in addition to the Sampler and the Pressure Relief Valve is rated to correct system pressure.

IMPORTANT: THE SAMPLER IS CAPABLE OF DEVELOPING VERY HIGH SAMPLE DISCHARGE PRESSURES, THIS TEST MUST BE CARRIED OUT WITH GREAT CARE.

The Sampler is capable and operates over a wide range 50 to 2250 psig. The following procedure is generic for all variations of the 210 Cell Sampler.

A) Bench testing: Support and Suspend the Sampler into a mineral oil or water reservoir. Continue to section 11.2

B) System testing: Ensure the Sampler is depressurised

11.2 Test equipment

ALL EQUIPMENT INCLUDING INTERCONNECTING PIPEWORK OR FLEXIBLE HOSE SHOULD BE INSPECTED AND VALIDATED FOR THE REQUIRED TEST PRESSURE.

Assemble a "test rig" (refer to Figure 9-1), comprising a "Tee" fitting, with the correctly rated Pressure Relief Valve (PRV) (See table below) and Needle Control Vent Valve. Connect the "test rig" to the Sample Outlet Port of the Sampler, and drain to suitable receptacle.

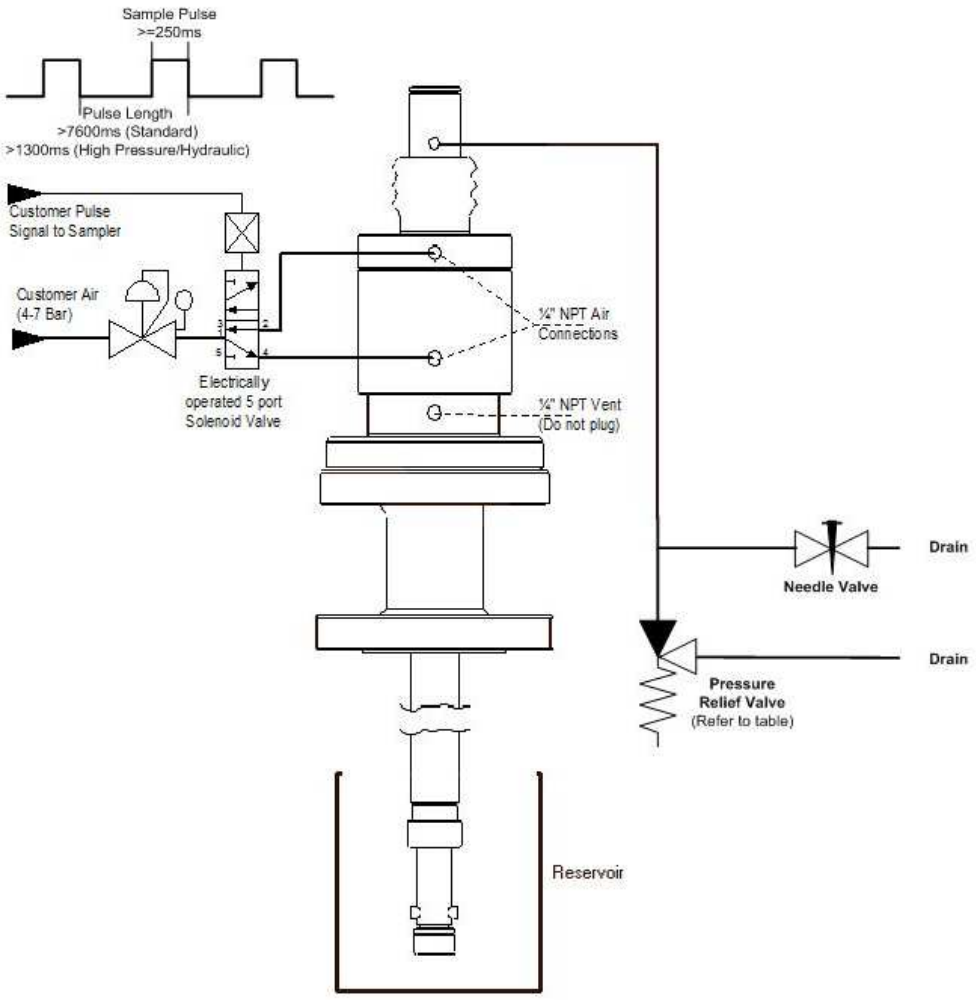


Figure 47 - Test Configuration

The following table illustrates spring pressure rating for Swagelok R3A style relief valves:

Jiskoot Part No.	Colour	Pressure Rating
3J-49-0085-00	Blue	50-350 psi
3J-49-0086-00	Yellow	350-750 psi
3J-49-0087-00	Purple	750-1500 psi
3J-49-0106-00	Orange	1500-2250 psig

Ensure the Pressure Relief Valve is rated to correct system pressure and the outlet is connected to a suitable receptacle.

Note the pneumatic or hydraulic actuator pressure setting are correct at 5 -8 barg

Operate the Sampler as described in Section 2 in single grab sequence until the sample grab is forced through the Pressure Relief Valve. This will validate the process grab is operating and sealing correctly.

The Sampler incorporates an internal non-return valve set nominally at 20 Barg, The external check valve prevents oil seepage under operating conditions.

Upon satisfactory testing, isolate the Sampler and open the Needle Control Valve, relieving the pressure on the "test rig".

12 Frequently Asked Questions

12.1 Sampler Does Not Operate

Prior to undertaking any of the following checks, ensure the Sampler outlet is un-obstructed and connected to a suitable receptacle.

Check that all Actuator and electrical connections are secure and correct

Check that the Actuator pressure, indicated on the air regulator or Hydraulic Power Pack discharge pressure gauge is between 5-8 Barg, re-adjust as required.

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

Is solenoid being energised? - Check Solenoid Fuse and operate manually where solenoid has manual override facility. Ensure that the electrical pulse signal supplied to the Solenoid Valve is the correct duration (500 millisecond minimum for air, 1 second minimum for hydraulic applications).

If the Sample Tube Head moves slightly, the sample outlet may possibly be obstructed. Check that external Check Valve setting and ensure the line to the Sample Receiver is not blocked.

Incorrect re-assembly?

12.2 Sampler Operates But Does Not Produce A Sample

Check all valves are open and that there is fluid in the pipeline.

Ensure the Actuator pressure is correct. If the pressure is too low, the Actuator will not stroke fully. Check the stroke of the Actuator is correct - the Sample Tube Head should move approximately 19mm.

Degradation of the Process Grab Seals, Anti-Vacuum Breaker 'O' Ring, or the Internal Non-return valve will cause a reduction or loss of sample grab volume. Refer to section 11.1 to ensure that they are sealing correctly.

12.3 Sampler fails to take adequate sample

Check that the Actuator pressure, indicated on the air regulator or Hydraulic Power Pack discharge pressure gauge is between 5-8 Barg, re-adjust as required.

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

Ensure the external Check Valve fitted to Sampler Outlet Adapter is set to 5 Bar above line pressure and 1 Bar above line pressure where an line-balanced external Check Valve is used.

Check the external check valve is set with the correctly sized spring for the system usage.

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

Ensure that the Sampler Controller is not either demanding too fast a sample grab rate (120 grabs per minute maximum), or that the signal to the solenoid is too short and not allowing the Actuator to travel to the full extent of its stroke.

If the above are satisfactory, then the Sampler will require a change of internal seals.

12.4 Sampler takes excessive sample

Ensure the external Check Valve fitted to Sampler Outlet Adapter is set to 5 Bar above line pressure and 1 Bar above line pressure where an line-balanced external Check Valve is used.

Check the external check valve is set with the correctly sized spring for the system usage, and is not passing fluid when the Sampler is not in operation.

If the above are satisfactory, then the Sampler will require a change of internal seals.

12.5 Leaks from Actuator

Pneumatic or Hydraulic motive power leaks from the Actuator are rare, if evident the Actuator 'O' Rings are worn or damaged.

Leaks from the Vent port indicate the Sampler requires servicing.

12.6 Vibration

Vibration is unlikely to occur in cell samplers.

13 Sub Supplier Information

The following sub supplied items are used in the 210 Sampler:

- Sampler Solenoid Valve (selected to suit application specific hazardous area requirements and power supply).
- Air regulator.

Neither of the above contains any user serviceable parts.

Hydraulic Power Pack (EH versions) - refer to H12 - Hydraulic Power Pack Handbook.

154 Series Hydraulic Extractor - refer to Hydraulic Extractor Handbook.

Line Balanced Relief Valve.

14 Recommended Spares Kits

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

14.1 Series 210, EH & EH-HP Sample Probe Service Kit

Commissioning and 1 Year Operation :

3J-45-0114-06	Probe Spare Kit for all 1CC and 210EH (Hydraulic)
3J-45-0125-06	Probe Spare Kit for all 2CC and 210EH (Hydraulic)
3J-45-0114-SD	SD Probe Spare Kit for all 1CC and 210EH (Hydraulic)
3J-45-0125-SD	SD Probe Spare Kit for all 2CC and 210EH (Hydraulic)

14.2 Series 210 HP Sample Probe Spare Parts

Commissioning and 1 Year Operation :

3J-45-0175-06	Probe Spare Kit for all 1CC 210HP

14.3 Series 210 Shipboard Sample Probe Spare Parts

Commissioning and 1 Year Operation :

3J-45-0205-06	Short Style Probe Spare Kit for all 1CC
3J-45-0206-06	Short Style Probe Spare Kit for all 2CC

14.4 Alternative Seals for MTBE & Similar Applications

Commissioning and 1 Year Operation :

3J-45-0197-06 Probe Spare Kit (Kalrez) for all 1CC and 210EH (Hydraulic)

14.5 Special Tools (Balseal Sizing tool, C Spanners, Pick, Seal tools)

3J-45-0126-00 Tool kit for all 1cc 210 Sample Probes
3J-45-0129-00 Tool kit for all 1cc 210 Sample Probes

14.6 Ancillary Equipment

Part/Sub- Assembly	Commissioning	1 Year Operation	2 Year Operation
Solenoid Coil (to suit application)	-	1	1

15 Product Specific Drawings

210 Probe General Arrangement (Typical) 17840

Seal Kit Location 29174

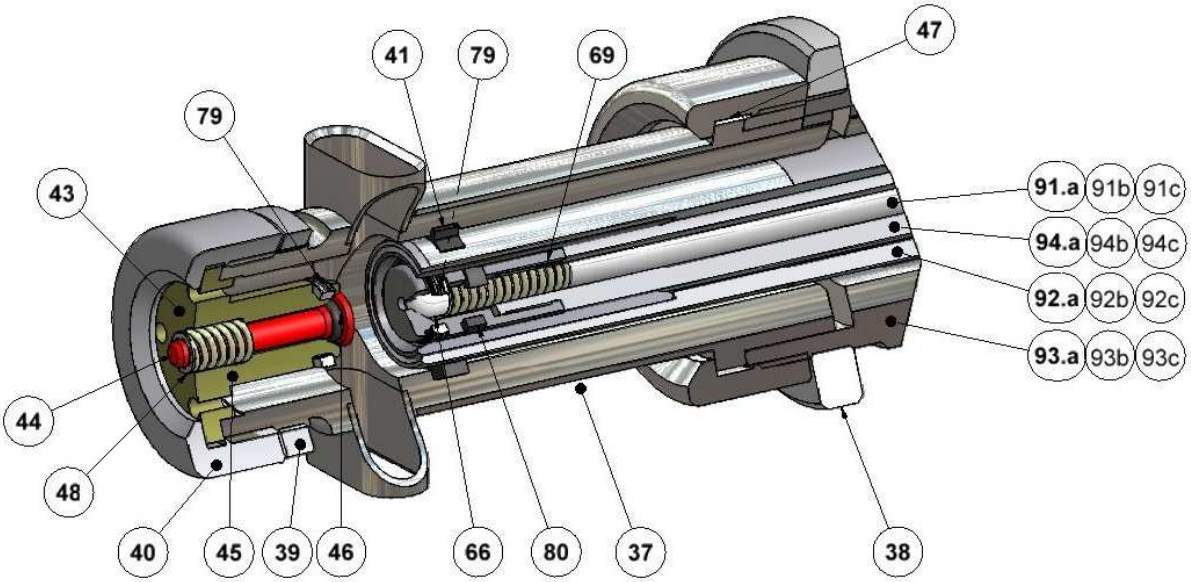
Probe Head Assembly 15377

Seal Assembly Procedure 18098 (Illustrated within manual)

Actuator Assembly 16213

16 Addenda – 210 2cc Sample Probe

The principle of operation of the 2cc version is identical to the standard 210 MkII Sampler, but achieves the increased sample size through the use of larger diameter Capture tube and Sample ends, causing a larger volume of product to be trapped.



The 2cc Sampler utilises the same Actuator and Seal housing as the standard 1cc version, but has a different End Plug (Item 43 & 66), Sample Tube (Item 93) Valve stem (Item 91) and Capture Tube (Item 92). The main sample seals, (Items 79) are also changed.

Overhaul of the Sampler is identical to the standard unit, with the exception of the larger diameter 2cc Balseals and Balseal forming tools.

See Probe Head Assembly 15377

17 Addenda – SD (Severe Duty) Probe Sampler

The principle of operation of the SD version is identical to the standard 210 Probe Sampler.

The SD variant has been developed specifically for the most demanding process conditions, where higher concentrations of particulates are present.

The 210 SD Probe is fitted with a robust wear resistant 'SD' coating on the capture tube, which combined with the advanced seal cartridge, provides extensive longevity over standard samplers.

The main seals for the 210 SD Probe have been upgraded and the vacuum breaker has been replaced with a maintenance-free seal-less valve seat.

Section 7 illustrates the main components within an SD Probe sampler.

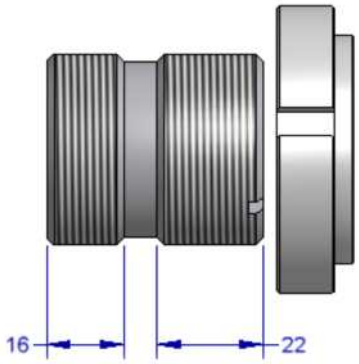
18 Addenda – High Temperature Probe Sampler

The principle of operation of the HT version is identical to the standard 210 Probe Sampler.

Site specific Risk Assessment and Safety Procedures must be in place to install and remove the Sampler Probe under elevated temperatures.

19 Addenda – Grab Volume Adjustment

Variations include Seal material, assembly and setup for grab volume remains similar for all EH, HP and standard variations.

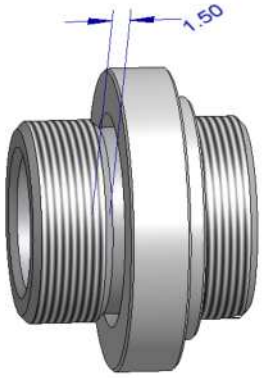


Molykote 1000 grease all threads.

Align Actuator Bush with the longer thread facing the Adjuster Lock Nut.

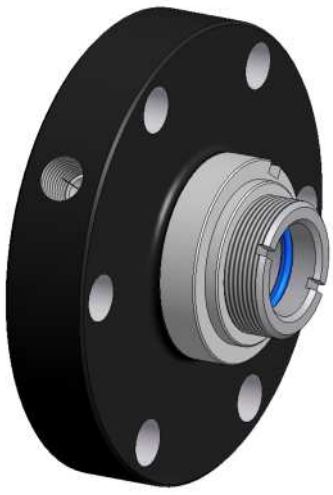
Screw the Adjuster Lock Nut to the Actuator Bush.

Volume Grab pre-adjustment :



1cc : install the Actuator Bush "O" Ring and position the lock nut approximately 1.5mm back from the undercut

2cc : install the Actuator Bush "O" ring and position the lock nut in line with the start of the 16mm thread.



Screw the assembly into the Top Housing and tighten

Install the "O" ring within the Actuator Bush

Install the "O" ring within the Top Housing

Notes

Notes

Notes

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