

JISKOOT™ MEASUREMENT SYSTEMS

+ JISKOOT™ MkII Constant Pressure Cylinder

Installation, Operation & Maintenance Manual



Important Safety Information

Terms Used in This Manual



WARNING

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



Caution

Caution statements indicate actions or procedures which, if not performed correctly, may lead to personal injury or incorrect function of the instrument or connected equipment.

Note

Indicates additional information about specific conditions or circumstances that may affect instrument operation.

Revision:	Description of change:	Issuer:	Approver:	Date:
6	Change document branding to Sensia.	S.Papworth	P.Whittle	12 Jan 2021
5	Removed the use of air pressure to dis-assemble the end cap.	J.Baker	P.Whittle	15 Jan 2015
4	Routine cleaning instructions added.	P.Whittle	M.A.Jiskoot	15 April 2008
3	Revised to reflect change in name from Jiskoot Autocontrol Ltd to Jiskoot Ltd	P.Whittle	M.A.Jiskoot	1 May 2007
2	Operating Instructions amended to include requirement for relief valve to be fitted to sampling system to prevent overfilling or pressurization.	P.Whittle	M.A.Jiskoot	16 May 2005
1	Revised to include 0.5 and 1 litre versions	P.Whittle	M.A.Jiskoot	11 May 2005
0	Issued for Mk III CPC	P.Whittle	M.A.Jiskoot	15 October 2003

*Mark of Sensia

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GENERAL

WARNING!

The specifications must not be exceeded, and the device must only be applied as described in the following.

Prior to the installation and commissioning of the unit, the installation guide must be examined carefully.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



INSTALLATION

WARNING!

All technical data on the instrument is to be observed.

Changes to the design and modifications to the equipment are not permitted.

The equipment shall only be operated as intended and only in undamaged and perfect condition.

Section 1: Introduction

The JISKOOT™ MkIII Constant Pressure Cylinders are designed for the receipt, storage and transportation of liquid or gaseous hydrocarbon samples. The JISKOOT™ Constant Pressure Cylinders are designed to be pre-charged with inert gas to maintain the sample at process pressure conditions for analysis.

JISKOOT™ Constant Pressure Cylinders are available in four sizes, 4 litre, 2 litre, 1 litre and 0.5 litre. The standard versions are manufactured from 316 Stainless steel, but may be supplied in 6Mo (UNS S31254), Duplex (UNS S31803) or Titanium to suit particular process conditions.

The JISKOOT™ MkIII Constant Pressure Cylinder is designed for a maximum operating pressure of 150 Bar. Internal seals are selected according to the properties of the product being collected, with the piston being changed to suit the seal type.

Internal pressure may be monitored via a pressure gauge, and the sample volume is shown on a magnetic indicator. The Constant Pressure Cylinder may be supplied with an intrinsically safe high-level switch located on the mounting brackets, which provides remote indication of a full cylinder.



Section 2: Operating Instructions



CAUTION

The 4 litre Constant Pressure Cylinder weighs approximately 21 kg when empty. The operator should ensure working procedures comply with applicable manual handling legislation and that adequate precautions are taken when moving the Constant Pressure Cylinder to avoid damage to personnel and equipment.

The Sample Inlet and Pre-charge connections of the Constant Pressure Cylinder are provided with needle valves for isolation and ¼” NPTF threaded connections to allow the end-user to select a coupling system to suit their requirements. Sensia recommend the use of the Swagelok QC4 DESO low volume self-sealing quick connect coupling, Swagelok Part No. SS-QC4-D-4PM.

The Sample Inlet and Gas Pre-charge ends of the Constant Pressure Cylinder are identified on the scale of the Sample Volume Indicator.



CAUTION

Using the Constant Pressure Cylinder in reverse, with the product connected to the Pre-charge may damage the internal components and will invalidate the warranty of the equipment.

The Pre-charge end of the JISKOOT™ Constant Pressure Cylinder must be pressurised with a suitable gas before use. The selection of the pre-charge gas will be dependent on local site policy and conditions, and whilst Nitrogen may be selected, it is common practice to use a gas that is not naturally present in the product being sampled.

When connecting to the Sampling System, the pre-charge connection of the Constant Pressure Cylinder must be connected to a pressure regulator, typically set to relieve at the nominal process line pressure, so that the sample will be maintained at the desired pressure.

The sample line is connected to the sample inlet (as indicated on the scale of the Sample Volume Indicator). Ensure both isolation valves are open and that pressure is indicated on the Pre-charge Pressure Gauge.

The sample inlet piping must incorporate a relief valve to prevent overfilling or over-pressurisation of the cylinder. This must be set to slightly above the maximum process design pressure and no higher than 150Barg.



CAUTION

To avoid the risk of the accidental release of the contents when in transit, the CPC is not fitted with relief valves or bursting discs, and is should only be filled to 80% of its total capacity. This will enable the pre-charge gas to become further compressed in the event of a change of temperature causing thermal expansion. The high-level switch (where supplied) should be set to operate at this point.

Before removing the Constant Pressure Cylinder from the Sampling System for transportation to the Laboratory, ensure both isolation valves are fully closed. Transportation should be carried out according to the local regulations for the transportation of pressurised containers. A carrying case is available as an option to prevent accidental damage to the pressure gauge and isolating valves during transportation.

The arrangements for extracting the sample from the Constant Pressure Cylinder will be determined by the Laboratory, and whether or not the Constant Pressure Cylinder has been supplied with a Septum.

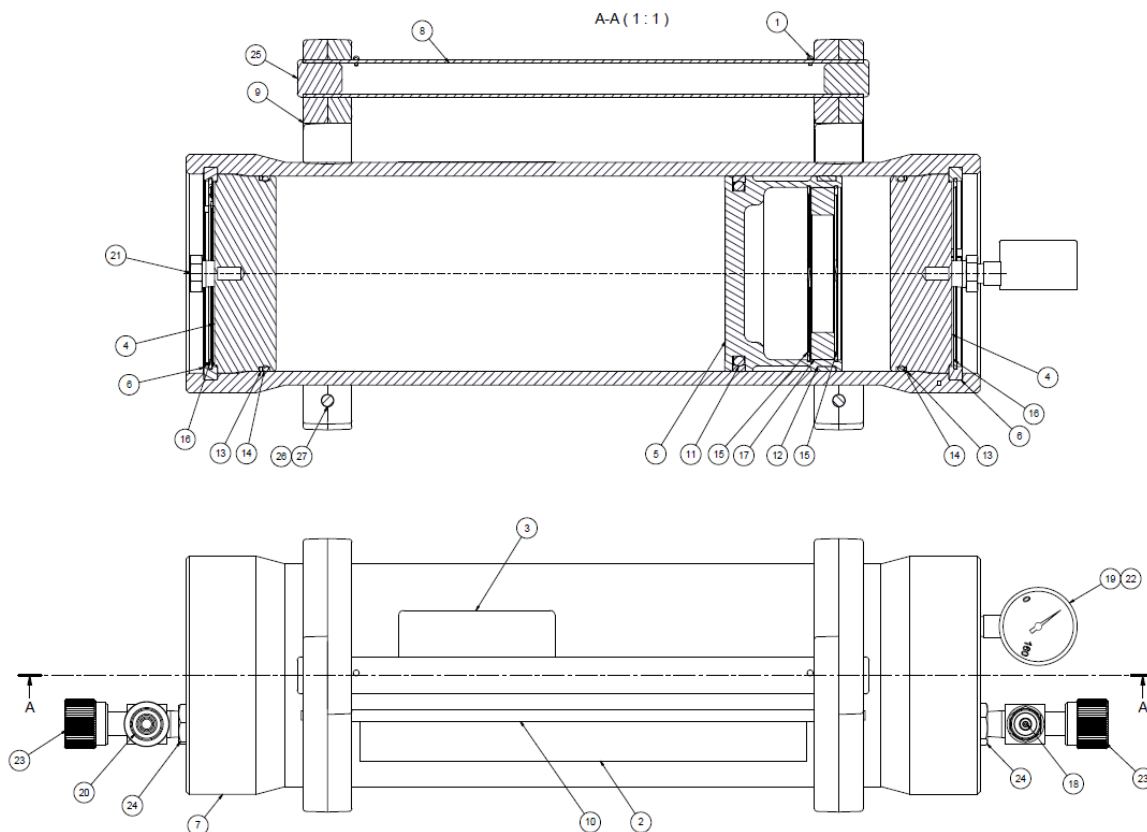
To ensure that the sample is adequately mixed prior to laboratory analysis, the Constant Pressure Cylinder should be connected to a JISKOOT™ ShearMix CPC Mixing Station or similar equipment to agitate and fully homogenise the sample.

To minimise cross contamination of samples, the Constant Pressure Cylinder must always be completely drained of product after completion of analysis, and it is recommended that a suitable flushing agent is used to remove traces of the last product, or the Constant Pressure Cylinder be stripped and cleaned after each use. The cleaning method used to minimise cross-contamination should be determined by the end-user.

Empty Constant Pressure Sample Cylinders must always be transported with a slight pre-charge pressure to ensure that the piston is retained against the End Cap and prevent it damaging the honed bore of the body.

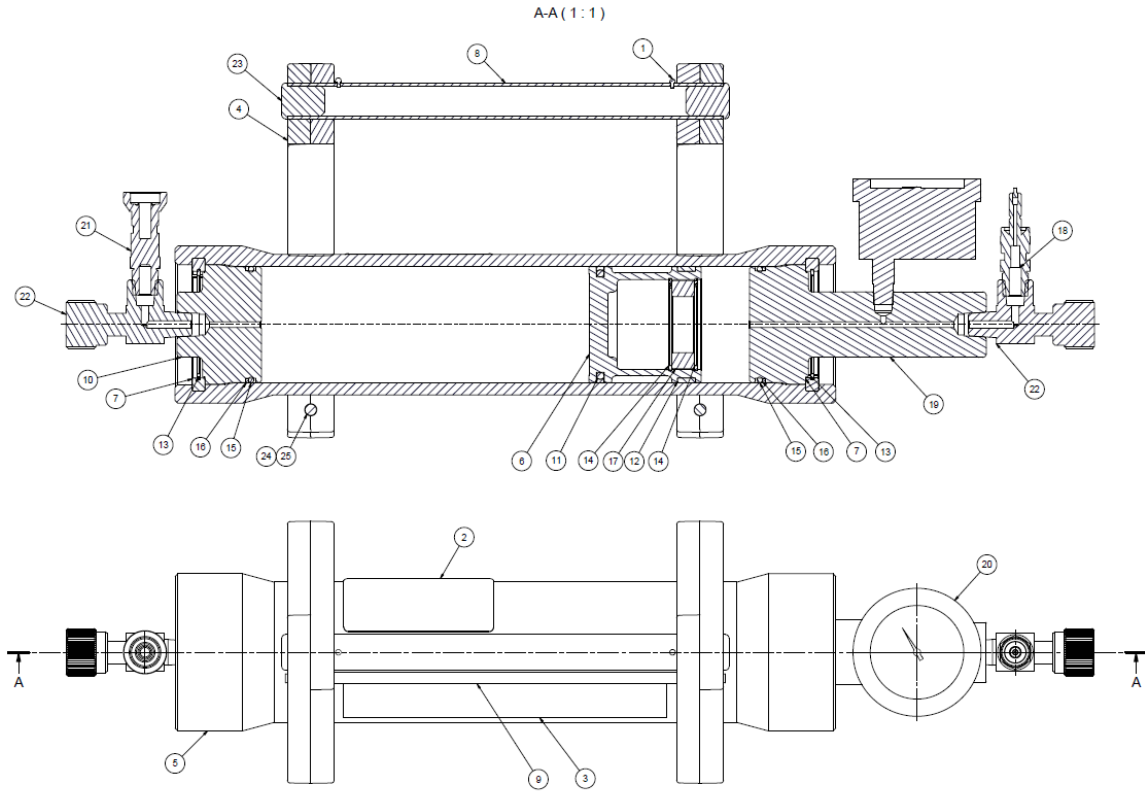
Section 3: General Assembly & Bill of Materials

3.1 2 LITRE & 4 LITRE VERSIONS



ITEM NO.	QTY	PART NUMBER	DESCRIPTION	ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	2		#0 Hammer Screw	13	2	3J-37-0767-00	PTFE Backup Ring
2	1	3J-33-0710-00	2 Litre Graduation Label	14	2	3J-37-0768-00	O Ring - 94 x 100 x 3
		3J-33-0709-00	4 Litre Graduation Label	15	2	3J-37-0769-00	Smalley Retaining ring
3	1	3J-33-0711-00	Warning Label	16	2	3J-37-0770-00	Smalley Retaining ring
4	2	3J-36-3395-00	End Cap	17	1	3J-38-0024-00	88 x 60 x12 Magnet
5	1	3J-36-3396-00	Piston	18	1	3J-1000167-00	QC Stem
6	2	3J-36-3397-00	Retainer Ring Set	19	1	3J-48-1729-00	Pressure Gauge 40mm 160 BAR BC
7	1	3J-36-3401-00	2 Litre Body	20	1	3J-49-0076-00	QC Body
		3J-36-3394-00	4 Litre Body	21	1	3J-48-0343-00	Hex Plug
8	1	3J-36-3402-00	2 Litre Carrying Handle	22	1	3J-48-0447-00	Reducing Bush
		3J-36-3403-00	4 Litre Carrying Handle	23	2	3J-48-0710-00	Needle Valve
9	4	3J-36-3404-00	Mounting Clamp	24	2	3J-48-0728-00	Gauge Adaptor
10	1	3J-36-3406-00	2 litre Level Indicator Tube Assembly	25	2	3J-99-0045-00	Plastic Bung
		3J-36-3407-00	4 litre Level Indicator Tube Assembly	26	2	3J-99-0060-00	Broach Insert M6
11	1	3J-37-0765-00	Piston Seal 100mm	27	2	3J-99-0061-00	Cap screw M6 x 45 SS
12	1	3J-37-0766-00	Slydring				


3.2 0.5 LITRE & 1 LITRE VERSIONS



ITEM NO.	QTY	PART NUMBER	DESCRIPTION	ITEM NO.	QTY	PART NUMBER	DESCRIPTION
1	2		#0 Hammer Screw	12	1	3J-37-0773-00	Slydring
2	1	3J-33-0711-00	Warning Label	13	2	3J-37-0774-00	Smalley Retaining ring
3	1	3J-33-0713-00	0.5 Litre Graduation Label	14	2	3J-37-0775-00	Smalley Retaining ring
3	1	3J-33-0712-00	1 Litre Graduation Label	15	2	3J-37-0776-00	O Ring - 56 x 62 x 3
4	4	3J-36-3405-00	Mounting Clamp for 75mm Body	16	2	3J-37-0777-00	PTFE Backup Ring
5	1	3J-36-3416-00	0.5 Litre Body	17	1	3J-38-0025-00	47 x 30 x12 Magnet
5	1	3J-36-3415-00	1 Litre Body	18	1	3J-1000167-00	QC Stem
6	1	3J-36-3418-00	Piston	19	1	3J-36-3417-00	End Cap
7	2	3J-36-3419-00	Retainer Ring Set	20	1	3J-48-1730-00	Pressure Gauge 40mm 160 BAR LBC
8	1	3J-36-3421-00	0.5 Litre Carrying Handle	21	1	3J-49-0076-00	QC Body
8	1	3J-36-3420-00	1 Litre Carrying Handle	22	2	3J-48-0710-00	Needle Valve
9	1	3J-36-3423-00	0.5 Litre Level Indicator Tube Assembly	23	2	3J-99-0045-00	19mm plastic bung
9	1	3J-36-3422-00	1 Litre Level Indicator Tube Assembly	24	2	3J-99-0060-00	Broach Insert M6
10	1	3J-36-3424-00	Short End Cap	25	2	3J-99-0061-00	Cap screw - M6 x 45 SS
11	1	3J-37-0772-00	Piston Seal 62mm				

Section 4: Maintenance and Troubleshooting

4.1 HEALTH AND SAFETY PRECAUTIONS

 **WARNING** This product contains a powerful rare earth magnet. Keep away from computers, credit cards and sensitive electronic equipment e.g. heart pacemakers

The JISKOOT™ Constant Pressure Cylinder may be used in applications involving carcinogenic or other hazardous products. Pressure from both the Product and Pre-charge ends of the Constant Pressure Cylinder must be released, and care must be taken to avoid contamination by any product trapped within the internal components as the Constant Pressure Cylinder is stripped down.

Low-pressure compressed air or gas must not be used to extract the internal components from the Body or the Constant Pressure Cylinder, as this may result in the uncontrolled release of the components with risk of injury or damage to equipment.

4.2 ROUTINE MAINTENANCE

Maintenance intervals will be primarily determined by the end-user's operating procedures, but it is recommended that the JISKOOT™ Constant Pressure Cylinder be stripped down and cleaned annually.

4.3 ROUTINE SAMPLE DECONTAMINATION

The CPC is intended for use with the JISKOOT™ ShearMix which has the ability to flush out the cylinder after use, however with residual volumes in the order of 1.5ml, sample carry-over should not cause a significant problem, and the decision on whether to flush out the residual sample may be left to the Laboratory or Operator.

Without a ShearMix, the method of carrying out a quick clean or decontamination of the CPC will depend on whether the CPC is for liquid or gas duty, although the principle is the same.

On gas use, open the pre-charge valve to atmosphere and connect the pre-charge gas (this gas should not be present in the sample) to the sample inlet, applying slight pressure to push the piston down to approximately half-way. Vent the sample inlet side of the cylinder and apply pressure to the pre-charge side of the cylinder to displace the flushing gas out of the sample end. This will effectively remove any trace of the previous sample.

On liquid service, it is recommended that the CPC be held vertically, with the sample end down. Vent the pre-charge end of the cylinder to atmosphere and pump a No 2 fuel oil, gas oil or other light liquid into the sample end of the cylinder until it is around half full. Agitate the cylinder to mix the residual sample with the flushing fluid and then carefully apply pre-charge pressure to the pre-charge end of the cylinder to empty the fluid out of the cylinder.

4.4 OVERHAUL OF CONSTANT PRESSURE CYLINDER

Note The item numbers shown as (xx) in this section refer to the 2 Litre and 4 Litre versions.

Before commencing the overhaul, note the orientation of the End Caps in relation to the Mounting Clamp.

Ensure that both Needle Valves (23) are fully open and pressure has been fully relieved prior to overhauling the Constant Pressure Cylinder.

Using a small flat screwdriver, remove the Smalley Retaining Ring (16) at the product end of the CPC and remove the End Cap Retaining Segments (6) from the Body (7).

Using a suitable set of pry bars, gently lever the process End Cap out of the Body. If excessive force is required, STOP. If the End Cap is not easily removed by prying it out of the body, the two M8 tapped holes should be used to extract the cap. Either a slide hammer or jacking screw technique should be used.

It is unnecessary to remove the pre-charge End Cap, unless it is required to change the Piston Seals or the O Ring on the End Cap. However, to extract the Piston and End Cap from the pre-charge end of the Body, remove the Smalley Retaining Ring from the end of the CPC and End Cap Retaining Segments from the Body as described above. Carefully insert a soft plastic or wooden dowel inside the Body and, taking care not to scratch or damage the honed bore of the CPC Body, gently tap the Piston to release the End Cap from the body and to push the piston out.

Carefully remove the Main Seal (11) and Slydring (12) from the Piston (5), taking care not to damage the sealing surfaces.

Clean any traces of product from the Body, Piston and End Caps, and ensure all seal grooves are free of debris and scratches.

Grease and replace the Main Seal (11) and Slydring (12) on the Piston.

Note The seals used for some services use a special piston and are not inter-changeable with other pistons. Always quote the Serial Number of the Constant Pressure Cylinder when ordering replacement parts

Lightly grease the Body and Piston assembly, and push the Piston into the Body, ensuring the recessed end of the Piston is facing the Pre-charge end of the Cylinder (indicated on Volume Graduation Label).

Grease and replace the 'O' Rings and Back-up Rings (14, 13) in the grooves in the End Caps (4).

Refit the End Caps, the cap with the pressure gauge being fitted to the Pre-Charge end of the Body.

Orientate the End Caps to Mounting Clamps as noted before stripping the CPC down.

Replace the three-piece End Cap Retaining Segments (6) in each end and secure with the Smalley Ring (16).

4.4.1 REPLACEMENT OF ISOLATING VALVE & PRESSURE GAUGE

To prevent the End Cap from rotating when unscrewing the Isolation Valves (23) or the Pressure Gauge (19), it is necessary to apply approximately 4 Bar of air pressure to the cylinder to lock the End Cap in position. The pressure must be released before fully removing the fittings.


Ensure that the threads are clean before fitting the new valve or gauge, applying thread sealant to the threads to prevent galling.

4.4.2 **REPLACEMENT OF LEVEL INDICATOR ASSEMBLY**

The Level Indicator is supplied as a complete replacement assembly to ensure that the magnets are correctly orientated.

To replace a broken Level Indicator, lay the Constant Pressure Cylinder on a flat clean bench and use a 5mm Allen Wrench to remove the two off M6 x 45 Cap screws that secure the Mounting Clamp to the CPC Body.

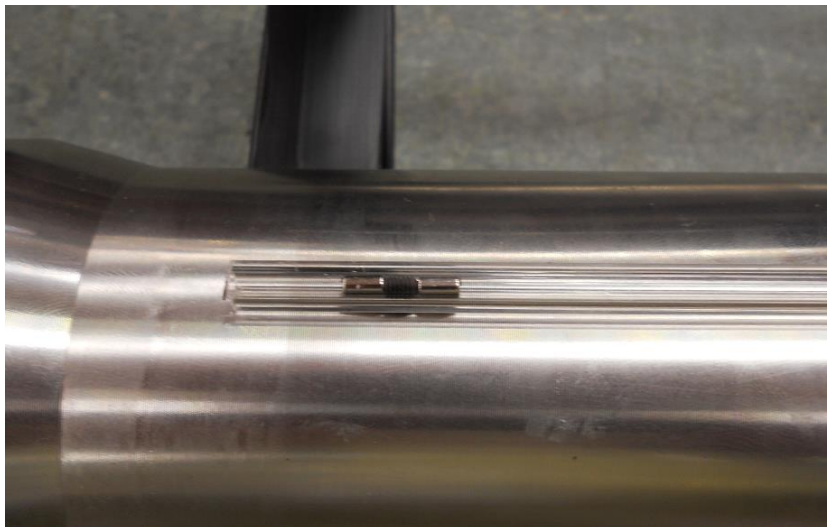
Carefully open the Mounting Clamps, moving both the left and right hand feet at the same time and in the same angular movement.

 **CAUTION** When opening and closing the 2 parts of the feet, the left-hand and right-hand feet must be moved exactly together. Failure to move the feet together will cause the indicator tube to shatter.

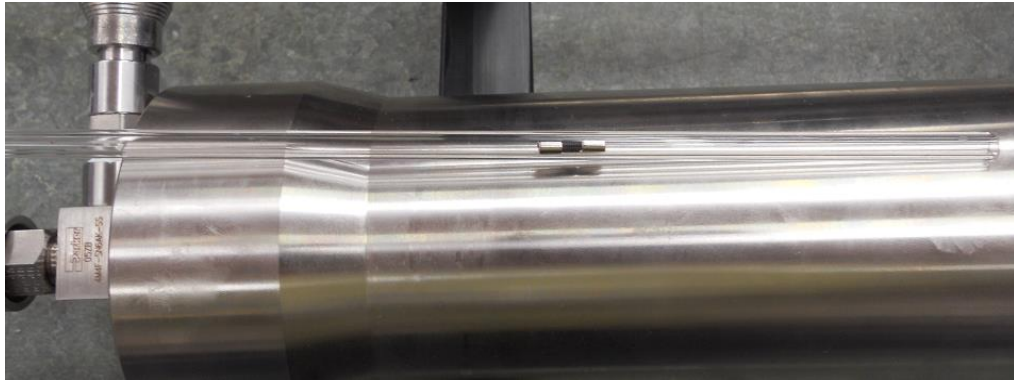


Remove any remnants of the old Level Indicator from the locating grooves in the Mounting Clamps.

Place the Level Indicator Assembly next to the CPC body and ensure that the magnet assembly sticks when next to the piston.



Move the tube left and right along the length of the CPC.



If the magnets are correctly aligned they will stay in position while the tube moves.

CAUTION If the magnets are reversed, the magnetic adhesion will break. Rotate the tube 180 degrees and try check alignment again.

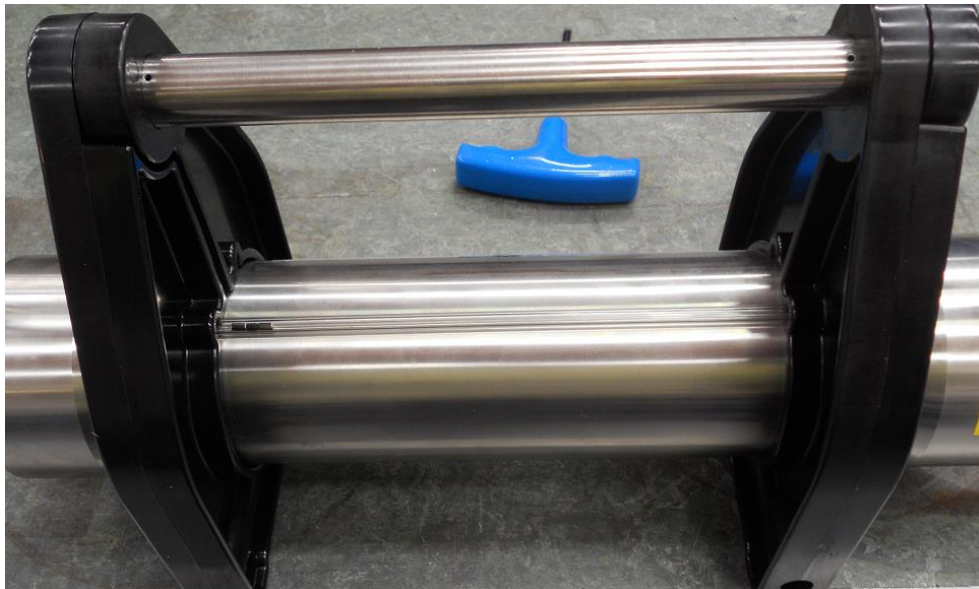
Insert the Level Indicator Assembly in the grooves in the Mounting Clamps taking care not to lose the magnet alignment.

CAUTION When opening and closing the 2 parts of the feet, the left-hand and right-hand feet must be moved exactly together. Failure to move the feet together will cause the indicator tube to shatter.

Carefully close the Mounting Clamps, moving both sides together. The left and right feet must be moved in unison.

Partially tighten the clamping screw for both feet.

Stand the CPC on its feet and fully tighten the clamping screws whilst keeping the feet flat on the workbench.



Stand the CPC on its feet and fully tighten the clamping screws whilst keeping the feet flat on the workbench.

Section 5: Recommended Spares List

The following spare parts are required to complete each overhaul of the Constant Pressure Sample Receiver, the annual usage being determined by the frequency with which the equipment is to be stripped for cleaning.

Note The seals used for some services use a special piston and are not inter-changeable with other pistons. Always quote the Serial Number of the Constant Pressure Cylinder when ordering replacement seals.

5.1 2 LITRE & 4 LITRE VERSIONS

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
14	2	3J-37-0768-00	O Ring
13	2	3J-37-0767-00	PTFE Backup Ring
11	1	3J-37-0765-00	Main Seal
12	1	3J-37-0766-00	Slydring

5.2 0.5 LITRE & 1 LITRE VERSIONS

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
15	2	3J-37-0776-00	O Ring
16	2	3J-37-0767-00	PTFE Backup Ring
11	1	3J-37-0772-00	Main Seal
12	1	3J-37-0773-00	Slydring

In addition, it is recommended that the following parts be held as replacements in case of accidental damage during handling.

ITEM NO.	QTY	PART NUMBER	DESCRIPTION
	1	3J-48-0710-00	Needle Valve
	1		Gauge (Please advise range and maximum operating pressure)
As applicable	1	3J-36-3406-00	2 litre Level Indicator Tube Assembly
	1	3J-36-3407-00	4 litre Level Indicator Tube Assembly
	1	3J-36-3422-00	1 Litre Level Indicator Tube Assembly
	1	3J-36-3423-00	0.5 Litre Level Indicator Tube Assembly

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Publisher Notes

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