Ford Lane
Bramshill
Hook
Hampshire
RG27 0RH
England

Tool Code: PSJ013

Document: MN-PSJ013-B

Production Swivel Joint

PRODUCTION SWIVEL JOINT

PSJ013: $2^{1}/_{8}$″ Atlas Ends

Operational & Maintenance Manual

Date: 17th July 1997

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C o n t e n t s

0 ABOUT THIS MANUAL

0.1 MANUAL HISTORY

Date	Issue	Description
17/07/01	A	Initial release
12/02/02	B	Manual updated to include Manual Updates MUD9915, MUD9933 & MUD9916.

0.2 UPDATES TO BE USED WITH THIS MANUAL

Date[a]	Update	Description

[a.] Note: this chapter shall be updated to include information on manual updates to be used with this manual, irrespective of current manual issue.

0.3 TECHNICAL HELP

For further technical help contact Sondex as follows:

Address: Ford Lane, Bramshill, Hook, Hampshire, RG27 0RH, UK
Telephone: +44(0)118 932 6755
Fax +44(0)118 932 6704
Email: support@sondex.co.uk

0.4 FEEDBACK

Please help us to improve future issues of this manual by sending comments or corrections to Sondex as above.

In your feedback please make reference to:

- The manual title, version and section
- Misprints, errors or unclear explanations
- General comments and suggestions.

Thank you.

Photographs and sketches are for illustration purposes only. Depending on the tool model that you have, certain features or dimensions may differ from those shown.

1 EQUIPMENT

1.1 DESCRIPTION

This is a monoconductor swivel joint which allows free rotation between the upper and lower heads while maintaining electrical continuity through the tool.

The top and bottom sub assemblies are linked by a shaft which is free to rotate on a set of ball bearings to support both lateral and vertical forces.

The device requires little maintenance as all connections and pressure feed throughs are contained in a pressure balanced oil bath separate from well fluids.

1.2 PURPOSE

Braided electric line has a tendency to rotate as it is payed out and pulled in. When it is important that the tool string does not rotate during logging, a swivel joint is connected at the top of the tool string directly beneath the electric line cable head. This allows the cable to rotate if necessary without the tool string being forced to turn.

A swivel joint may also be used within a tool string if one part of the string should stay oriented with the well while the rest of the string should rotate.

1.3 SPECIFICATION

Parameter	PSJ013
Diameter	$2^{1}/_{8}$″[a]
Pressure (max)	15,000 psi
Temperature (max)	200°C
Makeup Length (inch)	11.1
Materials	H_2S resistant
Through resistance	< 0.5 Ω
Conductor resistance to housing w/dry connectors	> 20 MΩ
End threads (top)	Atlas
End threads (bottom)	Atlas
End connectors (top)	Atlas
End Connectors (bottom)	Atlas
Torque required to turn (nominal)	0.1 ft.lb

[a] $1^{11}/_{16}$″ is also available.

2 SAFETY

Warning!

HOT WORK! Sondex equipment may, under certain circumstances or failure modes, become a potential source of ignition. Using it must therefore be considered "HOT WORK" and appropriate precautionary procedures should be followed when testing at surface in areas where there is a risk of gas leaks or other potentially explosive atmospheres.

3 OPERATING PROCEDURE

Ref: Assembly Drawing *09371*

3.1 BEFORE LOGGING CHECKS

3.1.1 MECHANICAL

1 Clean and grease upper and lower O'ring seals. Replace lower make-up joint O'rings (item 43) if damaged.

2 Check that joint rotates freely.

3.1.2 ELECTRICAL

3 Ensure that upper and lower electrical connectors are clean, dry and undamaged.

4 Upper to lower pin resistance should be less than 0.5Ω and remains steady while rotating the swivel.

5 Pin to housing resistance should be greater than 20MΩ on 250V.

3.2 CONNECTING TO TOOLSTRING

Upper and lower tool joint O'rings and seal surfaces should be clean, undamaged and lightly greased.

Production Swivel Joint may be inserted into a Production Logging toolstring in any location where rotation is required. However it is usually placed between the cable head and the top of the tool.

PSJ should not be used where rotation of the logging tool whilst logging is beneficial i.e. in Multifinger Image surveys.

3.3 LOGGING

Nothing specific. Check tool is not rotating relative to borehole while logging.

3.4 POST LOGGING DISASSEMBLY

The tool should be cleaned before the toolstring is disassembled.

Ensure that well fluid does not reach the electrical connectors. Refit thread protectors.

Check the gap between moving sleeve (item 3) and bearing housing (item 1) is $^1/_8$″. If it is larger suspect leakage of gas or water into the tool. If it is smaller, suspect oil has leaked out, and investigate.

4 MECHANICAL DESCRIPTION

Ref: Assembly Drawing *09371*

4.1 DESCRIPTION

The mono-conductor Production Logging Swivel Joint is made up of upper, middle and lower sections.

4.1.1 UPPER SECTION

- Monoconductor connector (item 9)
- Upper bleed screw (item 8)
- Pressure isolation connector (item 15)
- Internal connector assembly (item 36)
- Connector centraliser (item 35)

4.1.2 MIDDLE SECTION

- Thrust bearing Housing (item 1)
- Thrust & Radial bearings (items 20 & 19)
- Main shaft (item 5)
- Lower pressure isolation connector (item 15)
- Lower bearing housing (item 6)

4.1.3 LOWER SECTION

- Sliding sleeve (item 3)
- Lower bleed screw (item 8)
- Lower sub (item 4)
- Lower connector assembly (item 11)

4.2 INSPECTION OF INTERNAL ELECTRICAL CONNECTOR

4.2.1 PARTIAL DISASSEMBLY

1 Unclip the tang on the Anti-rotation spring (item 16) from the slot in the Thrust bearing housing (item 1) and unscrew the Upper sub (item 2) from the Thrust bearing housing. This is removed as a complete sub assembly. The oil will remain in the lower part of the tool. Add additional oil at this stage up to the level of the slot in the Thrust bearing housing.

2 With a suitable pair of long nose pliers remove the internal connector assembly from the upper sub for visual inspection. This consists of the Outer connector centraliser (item 35), which is removed first and the Female connector assembly (item 36).

Note: The Female connector assembly is contained within a plastic jacket which forms part of the internal seal around the pressure connectors. The jacket should be inspected for wear and if worn or damaged a new connector assembly with jacket should be fitted. The Connector centraliser contains two small O'rings (item 44) which should also be inspected.

4.2.2 REASSEMBLY

3 The connector assembly with jacket should be fitted into the Connector centraliser. Care should be taken not to damage the end of the jacket, as this has to locate around the end of the pressure connector on assembly.

4 Locate the Female connector assembly with Connector centraliser over the isolation pin fitted to the shaft. Push home until the plastic jacket locates over the white ceramic portion of the pin. This will seal the lower end of the female connector.

Note: As the ceramic section of the isolation pin is below the oil level, the air within the Female connector will be forced out leaving only the oil. If required additional oil may be added to the jacket to top up the oil level.

5 Ensure the Upper thrust bearing is correctly seated. Re-present the Upper sub to the Connector centraliser. As the sub is lowered it will mate with the Thrust bearing housing. (Care should be taken to keep the Upper sub vertical so that the internal connection is not damaged.) The Upper sub should now be screwed on.

6 As the Upper sub is turned it will gradually displace the excess oil in the Thrust bearing housing. This oil will be forced out of the top bleed screw hole. Continue turning the Sub until the tang on the anti-rotation spring is 1 to 2mm from the Thrust bearing housing. The Bleed screw should then be replaced.

7 Tighten the Bearing housing until the thrust bearings mate (this can be determined by a slight increase in resistance in the shaft rotation).

Note: Do not over tighten the upper sub as the shaft may lock up and damage the bearings.

8 Now that the oil is pressurised, the gap between the Sliding sleeve and shoulder on the Thrust bearing housing should be set to $^{1}/_{8}$″. By unscrewing one of the bleed screws and applying gentle force against the Sliding sleeve the excess oil will be displaced and the specified gap achieved.

9 Refit the bleed screw.

10 Reposition the Anti-rotation spring and locate the tang into the slot in the Bearing housing.

4.3 COMPLETE DISASSEMBLY & INSPECTION

4.3.1 DISASSEMBLY

Before carrying out a full tool service a number of checks should be carried out to determine whether there is any gas contained within the tool.

i. Has the tool retained the $^{1}/_{8}$″ gap between the end of the Sliding sleeve and the shoulder on the Thrust bearing housing?
ii. When compressing the Sliding sleeve is the sleeve held solid or is the action spongy? A spongy action would indicate the existence of gas inside the tool.

1 Remove Grub screws (item 23) and balls (item 21) in the Lower sub (item 4).

2 Unscrew and remove the sub from the Main shaft (item 5).

3 Position the tool vertically and remove the upper bleed screw (item 8).

4 With the tool over a suitable container, remove the lower bleed screw (item 8) and allow the oil to drain out.

5 Carry out tasks *1* and *2* in *Section 4.2.1 Partial Disassembly* above.

6 Unscrew the Sliding sleeve (item 3) from the internal Threaded ring (item 7) and remove from the assembly. The sleeve may need reasonable force to remove as there are two external O'rings (item 41), and two internal O'rings (item 42) in the assembly.

7 The tool is now in a state where the bearings, O'rings and any other moving parts can be examined for signs of wear or damage.

4.3.2 REASSEMBLY

1 Locate the Upper sub vertically with the top end facing down. Fit the upper bleed screw. Fill the internal bore with oil and then fit the Connector assembly with jacket into the internal bore so that it mates with the pressure isolation pin (item 15). The excess oil & air in the bore will be displaced by the connector.

2 The Connector centraliser should then be fitted into the bore and pushed in until it is nominally 0.19″ from the top of the Upper bearing washer seat in the Top sub.

3 The Main shaft with pin connector should be mated with the connector in the top sub.

Note: Ensure the upper thrust bearing (item 20) is in position with one of the bearing washers and the race seated on the Upper sub and the other half located on the Main shaft.

4 Keeping the assembly vertical present the lower isolation pin (attached to the shaft) into the Connector. As the pin is pushed home into the Connector it will form the internal oil seal.

5 First ensure the Lower thrust bearing (item 20) is seated correctly on the shaft.

6 Next fit the Thrust bearing housing (item 1) over the shaft and into position on the Upper sub.

7 Screw the Bearing housing on until it is approximately 1 to 2mm above the tang on the Anti rotation spring (item 16).

8 Refit the Sliding sleeve over the Main shaft and push home until it is past the two external O'rings (item 41).

9 The Sleeve then has to be screwed fully onto the internal Threaded ring which controls the Sleeve travel.

4.3.3 OIL FILLING

Prior to refilling the tool the new oil should be placed in a vacuum to remove gas from within the oil. This reduces the possibility of pockets of air forming inside the tool which would compromise performance.

1 Lay the part-assembled tool horizontally with the upper bleed screw hole facing upwards.

2 Remove the bleed screw and fit the filler plug with bottle on to the tool. Return the tool to a vertical but upside-down position slightly angled, so that the lower bleed screw is uppermost.

3 Squeeze the filler bottle to force oil up into the tool.

4 Continue filling until oil is expelled from the bleed hole in the sliding sleeve. Look carefully as the oil is expelled to ensure all the air has been forced from the tool.

5 Refit the lower bleed screw and position the tool horizontally with the filler plug facing upwards.

6 Remove the plug and refit the upper bleed screw.

7 Tighten the Bearing housing until the thrust bearings mate (this can be determined by a slight increase in resistance in the shaft rotation).

Note: Do not over tighten the upper sub as the shaft may lock up and damage the bearings.

8 Now that the tool is pressurised the gap between the Sliding sleeve and shoulder on the Thrust bearing housing should be reduced to $^{1}/_{8}''$. By unscrewing one of the bleed screws and applying gentle force against the Sliding sleeve the specified gap will be achieved.

9 Retighten the bleed screw.

10 Reposition the Anti-rotation spring and locate the tang into the slot in the Bearing housing.

11 Refit the Lower sub with connector onto the Main shaft. Screw on until the anti rotation screw holes line up with their respective dimples in the shaft.

12 Refit the balls and grub screws.

4.4 MAINTENANCE

See: *Section 3.1 Before Logging Checks*

APPENDIX A EQUIPMENT & RECOMMENDED SPARES

Item	Part no.	Description	Remarks
1	PSJ013	Production Swivel Joint MKII $2^{1}/_{8}''$	Atlas ends.

A.1 ANCILLARY EQUIPMENT

Item	Part no.	Description	Qty	Remarks
1	*91296*	$2^{1}/_{8}''$ Tool Kit	1	
2	04053	Flushing Kit	1	
3		Silicone oil	A/R	to fill PSJ

A.2 RECOMMENDED SPARES

Item	Part no.	Description	Qty	Remarks
1	*KITB-PSJ2 1/8*	Basic Spares Kit	1	
2	*KITR-PSJ2 1/8*	Recommended Spares Kit	1	
3	*KITRem-PSJ2 1/8*	Remote Spares Kit	1	

PARTS LISTING

Part:	Issue:		Drawn:	Checked:	Approved:
91296	-		PD	PD	DJF
			Date: 1/14/2002	Date: 1/14/2002	Date: 1/14/2002

Description:
Tool Kit for all 2 1/8 Tools SX and GO

CHANGE HISTORY					RELATED DOCUMENTS		
Iss	*Date*	*Remarks*	*Chkd*	*Appr*	*# Documents*	*Issue*	*Notes*
-	1/14/2002	Initial Release	PD	DJF			

PARTS LIST

Item	Part No.	Issue	Description	Component Value	Qty	Units	Remarks
001	91006	-	Spanner Open Ended 1 7/8x1 11/16 A/F		2.00	ea	
002	91023	-	Spanner C (50 - 80)		1.00	ea	
003	10038	A	Spanner Box 3/8 x 5/16 Modified		2.00	ea	
004	91028	-	Spanner 3/8x5/16		1.00	ea	
005	91027	-	Spanner Single Open End 18mm		1.00	ea	
006	91029	-	Key Hex Metric		1.00	ea	
007	91030	-	Punch Pin Parallel set		1.00	ea	
008	00615	A	Assy Spanner PKJ		1.00	ea	
009	91293	PT1	Screwdriver Parallel tip (3 0 x 75)		1.00	ea	
010	91105	-	Toolroll With SX Badge Large Black		1.00	ea	
011	91104	-	Screwdriver Parallel tip (5 5 x 200)		1.00	ea	
012	91103	-	Pliers Circlip 812 Chrome/Van		1.00	ea	
013	91102	-	Pliers Mini Flat Nose 5 Inch		1.00	ea	
014	10037	A	Bar Tommy		2.00	ea	
015	10051	A	Hex Socket Nut 4BA MOD		1.00	ea	
016	91280	-	Hammer, 4oz ball pein		1.00	ea	
017	91131	-	Pin C Spanner 2 5		1.00	ea	

(AR = As Required)

PARTS LISTING

Part:	Issue:		Drawn:	Checked:	Approved:
KITB-PSJ2 1/8	-		MB	PJ	
			Date: 2/12/02	Date: 2/12/02	Date: --/--/--

Description:
Kit, Spares, Basic, PSJ (2 1/8)

CHANGE HISTORY

Iss	*Date*	*Remarks*	*Chkd*	*Appr*
-	2/12/02	Initial release	PJ	

RELATED DOCUMENTS

#	*Documents*	*Issue*	*Notes*

PARTS LIST

Item	*Part No.*	*Issue*	*Description*	*Component Value*	*Qty*	*Units*	*Remarks*
001	03848	B	Screw Plug		2.00	ea	
002	91000	-	Bearing Ball 3/16 Hard		3.00	ea	
003	01063	-	Screw, Grub Skt Hd, M6 x 8mm Long, St/Steel		3.00	ea	
004	01047	-	Circlip, Internal, 5/8, St/Steel		1.00	ea	
005	03874	A	Assy Connector Jacket		1.00	ea	
006	04053	C	Assy Flushing Kit (QPS, ILS, PSJ, DBT)		1.00	ea	

(AR = As Required)

PARTS LISTING

Part:	Issue:		Drawn:	Checked:	Approved:
KITR-PSJ2 1/8	-		MB	PJ	
			Date: 2/12/02	Date: 2/12/02	Date: --/--/--

Description:
Kit, Spares, Recommended(25Run), PSJ(2 1/8)

CHANGE HISTORY

Iss	*Date*	*Remarks*	*Chkd*	*Appr*
-	2/12/02	Initial release	PJ	

RELATED DOCUMENTS

#	*Documents*	*Issue*	*Notes*

PARTS LIST

Item	*Part No.*	*Issue*	*Description* *Component Value*	*Qty* *Units*	*Remarks*
001	03881	A	Ring Retaining 2 1/8 Mk2	1.00 ea	
002	03848	B	Screw Plug	2.00 ea	
003	03806	A	Spring Locking, 2 1/8	1.00 ea	
004	91000	-	Bearing Ball 3/16 Hard	6.00 ea	
005	01063	-	Screw, Grub Skt Hd, M6 x 8mm Long, St/Steel	6.00 ea	
006	91080	-	Cup Ball M5, c/w Spring Plunger	1.00 ea	
007	01047	-	Circlip, Internal, 5/8, St/Steel	2.00 ea	
008	03874	A	Assy Connector Jacket	1.00 ea	
009	95008	-	O Ring Viton 75 Type 008	50.00 ea	
010	99013	-	O Ring Viton 90 Type 013	50.00 ea	
011	95129	-	O Ring Viton 75 Type 129	50.00 ea	
012	95133	-	O Ring Viton 75 Type 133	50.00 ea	
013	95213	-	O Ring Viton 75 Type 213	50.00 ea	
014	99211	-	O Ring Viton 90 Type 211	50.00 ea	
015	95009	-	O Ring Viton 75 Type 009	50.00 ea	

(AR = As Required)

PARTS LISTING

Part:	Issue:		Drawn:	Checked:	Approved:
KITRem-PSJ2 1/8	-		MB	PJ	
			Date: 2/12/02	Date: 2/12/02	Date: --/--/--

Description:
Kit, Spares, Remote(25Run), PSJ(2 1/8)

CHANGE HISTORY				
Iss	*Date*	*Remarks*	*Chkd*	*Appr*
-	2/12/02	Initial release	PJ	

RELATED DOCUMENTS		
# Documents	*Issue*	*Notes*

PARTS LIST

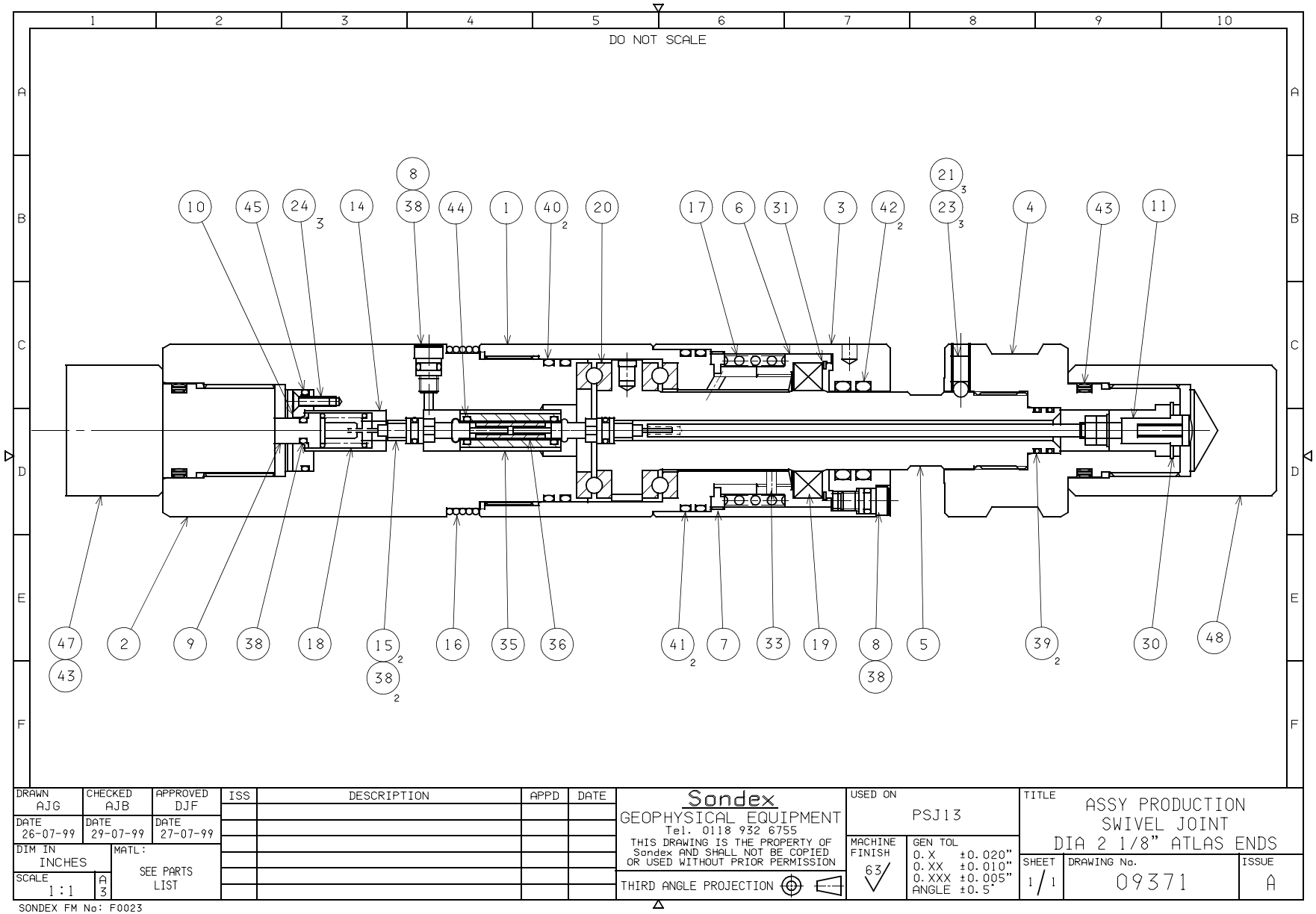
Item	*Part No.*	*Issue*	*Description* *Component Value*	*Qty Units*	*Remarks*
001	03882	A	Shaft Main 2 1/8 Mk2	1.00 ea	
002	03881	A	Ring Retaining 2 1/8 Mk2	1.00 ea	
003	03848	B	Screw Plug	4.00 ea	
004	03895	B	Assy Upper Connector SX	1.00 ea	
005	03859	C	Assy Lower Connector & Rod SX	1.00 ea	
006	00693	A	Retainer Insulator	1.00 ea	
007	92009	-	Connector Mono Pressure Isolation, Pin 0 062 OD x 1 95 LG	2.00 ea	
008	03806	A	Spring Locking, 2 1/8	2.00 ea	
009	03887	A	Spring Compression 2 1/8	1.00 ea	
010	91015	-	Bearing Radial	1.00 ea	
011	91014	-	Bearing Thrust	2.00 ea	
012	91000	-	Bearing Ball 3/16 Hard	12.00 ea	
013	01063	-	Screw, Grub Skt Hd, M6 x 8mm Long, St/Steel	12.00 ea	
014	91080	-	Cup Ball M5, c/w Spring Plunger	2.00 ea	
015	01047	-	Circlip, Internal, 5/8, St/Steel	4.00 ea	
016	93238	-	Ring Retaining 1 625 (Bore) SS	1.00 ea	
017	03873	B	Centraliser Connector	1.00 ea	
018	03874	A	Assy Connector Jacket	2.00 ea	
019	95008	-	O Ring Viton 75 Type 008	100.00 ea	
020	99013	-	O Ring Viton 90 Type 013	100.00 ea	
021	95129	-	O Ring Viton 75 Type 129	100.00 ea	
022	95133	-	O Ring Viton 75 Type 133	100.00 ea	
023	95213	-	O Ring Viton 75 Type 213	100.00 ea	
024	99211	-	O Ring Viton 90 Type 211	100.00 ea	
025	95009	-	O Ring Viton 75 Type 009	100.00 ea	
026	04053	C	Assy Flushing Kit (QPS, ILS, PSJ, DBT)	1.00 ea	

(AR = As Required)

APPENDIX B DRAWINGS & PARTS LISTS

Drawings and parts lists after this page.

PSJ013 $2^{1}/_{8}''$ Atlas ends	General Assembly	*09371-A*
	Parts List	*PL-09371-A*



DRAWN	CHECKED	APPROVED
AJG	AJB	DJF
DATE 26-07-99	DATE 29-07-99	DATE 27-07-99
DIM IN INCHES	MATL: SEE PARTS LIST	
SCALE 1:1	A3	

ISS	DESCRIPTION	APPD	DATE

Sondex
GEOPHYSICAL EQUIPMENT
Tel. 0118 932 6755

THIRD ANGLE PROJECTION

USED ON: PSJ13

MACHINE FINISH: 63

GEN TOL
0.X ±0.020"
0.XX ±0.010"
0.XXX ±0.005"
ANGLE ±0.5°

TITLE: ASSY PRODUCTION SWIVEL JOINT DIA 2 1/8" ATLAS ENDS

SHEET	DRAWING No.	ISSUE
1/1	09371	A

SONDEX FM No: F0023

PARTS LISTING

Part:	Issue:	Parent Tool Code:	Drawn:	Checked:	Approved:
09371	A	**PSJ013**	AJG	AJB	DJF
			Date: 7/26/99	Date: 7/29/99	Date: 7/27/99

Description:
Production Swivel Joint, 2 1/8, Atlas

CHANGE HISTORY

Iss	*Date*	*Remarks*	*Chkd*	*Appr*
A	7/26/99	Initial Issue	AJB	DJF

RELATED DOCUMENTS

#	*Documents*	*Issue*	*Notes*
01	03876	A	Shaft dimpling drawing
02	03875	A	Machining drawing - anti rotation pin
03	AI07033	A	Disassembly & inspection instructions
04	03874	A	Assembly connector jacket
05	09371	A	Assembly drawing

PARTS LIST

Item	*Part No.*	*Issue*	*Description* *Component Value*	*Qty* *Units*	*Remarks*
001	03878	B	Housing Bearing Upper 2 1/8 Mk2	1.00 ea	
002	03897	A	Sub Upper Mk2 Dia 2 1/8 ATLAS End	1.00 ea	
003	03880	B	Sleeve Moving 2 1/8 Mk2	1.00 ea	
004	03898	A	Sub Lower Mk2 Dia 2 1/8 ATLAS End	1.00 ea	
005	03882-1	A	Assy Shaft Main 2 1/8 Mk2	1.00 ea	
006	03883	A	Housing Bearing Lower 2 1/8	1.00 ea	
007	03881	A	Ring Retaining 2 1/8 Mk2	1.00 ea	
008	03848	B	Screw Plug	2.00 ea	
009	03866	B	Assy Connector Upper ATLAS	1.00 ea	
010	03864	A	Retainer Insulator ATLAS	1.00 ea	
011	10801	A	Assy Connector & Rod Dia 2 1/8 ATLAS	1.00 ea	
012					
013					
014	03861	A	Cup Insulating ATLAS	1.00 ea	
015	92009	-	Connector Mono Pressure Isolation, Pin 0 062 OD x 1 95 LG	2.00 ea	
016	03806	A	Spring Locking, 2 1/8	1.00 ea	
017	03887	A	Spring Compression 2 1/8	1.00 ea	
018	91038	-	Spring Compression St/St 0 420 (OD) x 0 750 (FL) 50 8lb/in	1.00 ea	
019	91015	-	Bearing Radial	1.00 ea	
020	91014	-	Bearing Thrust	2.00 ea	
021	91000	-	Bearing Ball 3/16 Hard	3.00 ea	
022					
023	01063	-	Screw, Grub Skt Hd, M6 x 8mm Long, St/Steel	3.00 ea	
024	93147	-	Screw Csk Hd Slotted M3x10mm Lg SS	3.00 ea	
025					
026					
027					
028					
029					
030	01047	A	Circlip, Internal, 5/8, St/Steel	1.00 ea	
031	93238	-	Ring Retaining 1 625 (Bore) SS	1.00 ea	
032					
033	93005	-	Pin, Spirol, 2 5mm x 16mm Lg, SS	1.00 ea	

PARTS LISTING

Part:	Issue:	Parent Tool Code:	Drawn:	Checked:	Approved:
09371	A	**PSJ013**	AJG	AJB	DJF
			Date: 7/26/99	Date: 7/29/99	Date: 7/27/99

Description:
Production Swivel Joint, 2 1/8, Atlas

PARTS LIST

Item	*Part No.*	*Issue*	*Description*	*Component Value*	*Qty*	*Units*	*Remarks*
034							
035	03873	A	Centraliser Connector		1.00	ea	
036	03874	A	Assy Connector Jacket		1.00	ea	
037							
038	95008	-	O Ring Viton 75 Type 008		5.00	ea	
039	99013	-	O Ring Viton 90 Type 013		2.00	ea	
040	95129	-	O Ring Viton 75 Type 129		2.00	ea	
041	95133	-	O Ring Viton 75 Type 133		2.00	ea	
042	95213	-	O Ring Viton 75 Type 213		2.00	ea	
043	99211	-	O Ring Viton 90 Type 211		2.00	ea	
044	95009	-	O Ring Viton 75 Type 009		2.00	ea	
045	95019	-	O Ring Viton 75 Type 019		1.00	ea	
046							
047	10133	A	Thread Protector Male 1 1/8-12UN ATLAS		1.00	ea	
048	10132	A	Thread Protector Female 1 1/8-12UN ATLAS		1.00	ea	

(AR = As Required)