


<b>CUSTOMER :</b> Custom 1	<b>SERVICE ORDER #:</b> 4775522	  <b>FISCHER USA, Inc</b> 3715 Blue River Avenue Racine, WI 53405 USA Phone: +1 262 632 6173 Fax: +1 262 632 6730 Email: info-fusa@fischerspindle.com
<b>Spindle Type:</b> ANY	<b>Date Received:</b> 07-04-16	
<b>FUSA Serial #:</b> 10123456	<b>New:</b>	
<b>OEM Serial #:</b> 99-88-5522	<b>Prior Repair :</b> 12-25-15	
<b>Cat. # (Art. #):</b> 159753	<b>Warranty Evaluation :</b> NO	

# Spindle Analysis

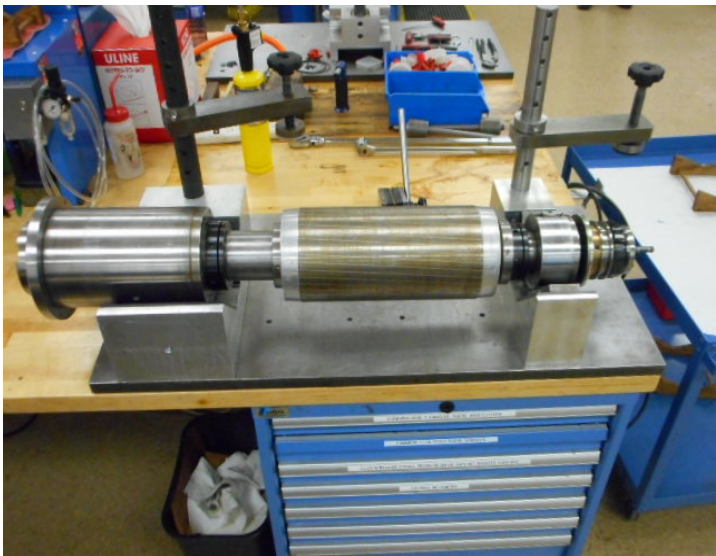


Date : 07-05-2016	Prepared by: J.Sorenson
Customer-Form_Precise_3 <sup>rd</sup> -party_rev3	Reviewed by: D. Kranz

**FISCHER USA, Inc.** specializes in the design, manufacture, and repair of precision spindles.  
**The only authorized service center** for FISCHER, PRECISE, and FORTUNA SPINDLES in North & South America.

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Photos of spindle as received:



(Side)



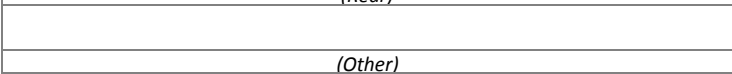
(Front)



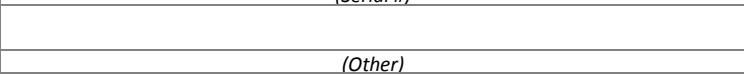
(Rear)




(Serial #)

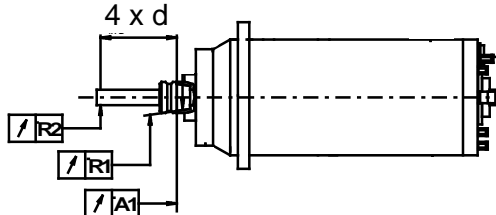


(Other)



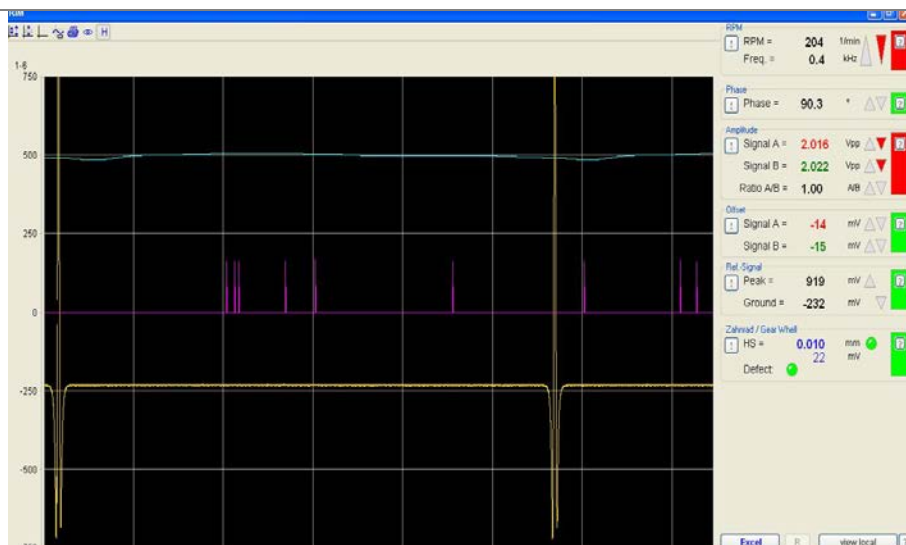
(Other)

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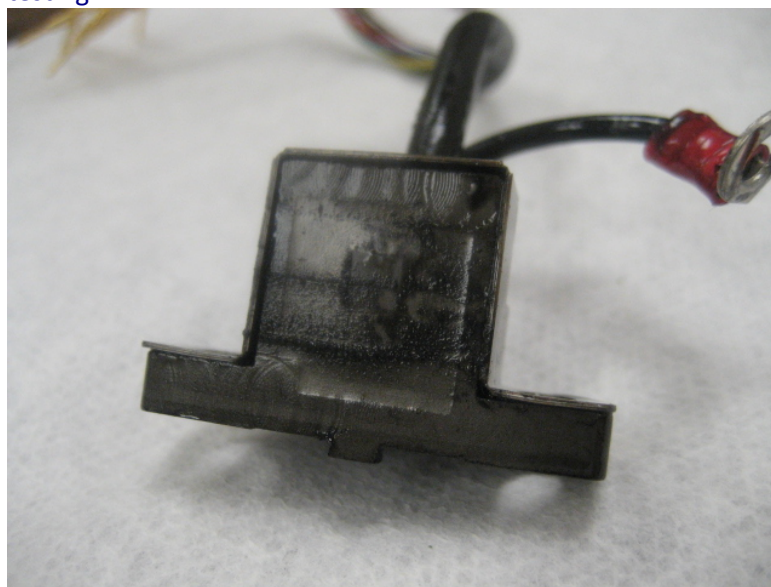
Spindle Analysis Report:									
1. Customer Information									
Spindle runs rough.									
2. Entry Checks									
	Can shaft be turned freely?			YES	X	NO			
	Run out			Measured Value					
	R1 (shaft taper/bore) max .003			0.005 mm					
	R2 (test arbor)			0.010 mm					
	A1 (shaft face)			0.003 mm					
	Clamping System								
	Clamping Force			13.2 kN					
	Electrical								
	Hi-Pot Test			Pass	X	Fail			
	Ground-bond Test			Pass	X	Fail			
	Cooling Circuit								
	Flow Rate			OK	X	Low		None	
	Leak Test			OK		X	Leaks		
	Additional Comments:								
	Spindle bearings feel rough when turning shaft by hand.								
3. Tool Position Sensors (optional)									
Sensor 1		Sensor 2		Sensor 3		Sensor 4			
Sensor Condition:		OK		OK		OK			
4. Other Sensors (optional)									
PT100 #1		PT 100 #2							
Sensor Condition:		N/A		N/A					
5. Motor									
2-ph asynchronous		3-ph asynchronous		3-ph synchronous		Universal (brush)			
		X							
5.1	Stator:	OK							
5.2	Rotor:	OK							
5.3	Thermistor:	OK							

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#### 5.4 Tachometer / encoder:



Encoder amplitudes are out of spec. Reading 2V peak to peak during testing.



Encoder heavily contaminated.

6. Clamping System		Collet (0)	Grinding arbor (1)	Steep taper (2)	Direct shank (3)	HSK (4)	other
6.1	Collet (0, 3 only):					X	
6.2	Gripper Set (2,4 only):	Replace due to wear and tear.					



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6.3 Drawbar (2,3,4 only):

Damaged from high vibrations.



6.4 Disc Springs (2,3,4 only):


Broken springs, replace.

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7. Front Seal Area					
8. Bearing Lubrication Type / Condition		OK	Dry	Dirty	Other
	Grease:				
	Oil-mist:				
	Oil-air:			X	

9. Bearings		
9.1	Front Bearings:	Fretting corrosion and contamination. 

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9.2	Middle Bearings:	N/A
9.3	Rear Bearings :	Fretting corrosion and contamination.
		

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#### 10. ATC Cylinder

<b>ATC Cylinder Condition:</b>		<b>OK</b>
10.1	O-rings / Quad rings / O-rings	<b>Wear and tear.</b>
10.2	Piston Rod:	<b>Damaged from contact with rotating component in operation.</b>
		

#### 11. Coolant-Thru Unit

<b>Coolant-Thru Unit Condition:</b>	<b>Not ok.</b>
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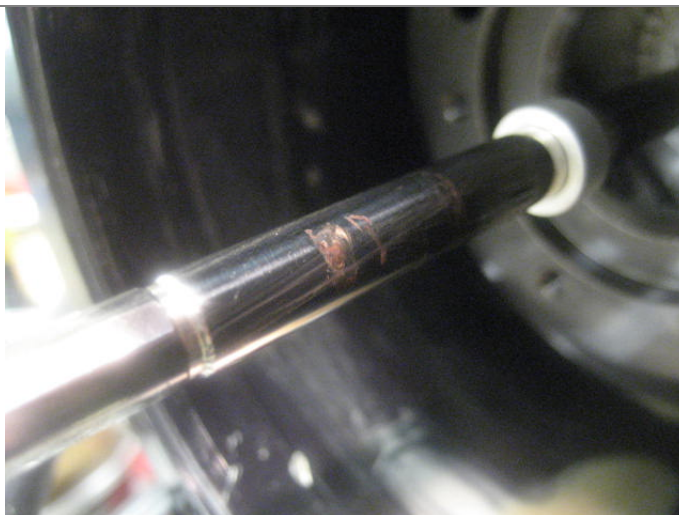
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### 11.1 Bearings



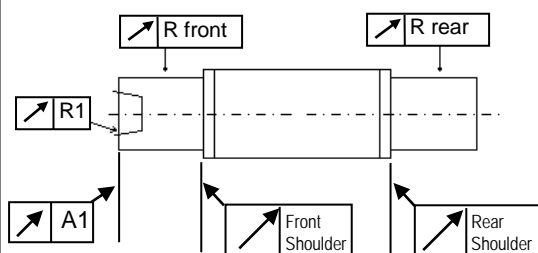
Hard to turn.

### 11.2 Seals:



Transition piece damaged from high vibrations.


## 12. Shaft (disassembled)



Run out	Tolerance		Measured Value
R1 (taper/bore)	0.003	mm	0.006 mm
A1 (face)	0.001	mm	0.002 mm
R-front diameter	0.003	mm	0.008 mm
R-rear diameter	0.003	mm	0.0025 mm
R-front shoulder	0.001	mm	0.0045 mm
R-rear shoulder	0.001	mm	0.005 mm
<b>Shaft Condition:</b>		Bearing journals damaged from fretting corrosion.	

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12.1	Balance Collars / Clamp Rings:	OK
12.2	Slinger / front nut:	OK
<b>13. Spindle Main Housing</b>		
Housing Condition:		Not OK. Bearing bore is damaged from fretting corrosion.

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13.1 Seal plates / pressure test: OK


13.2 Cooling passages: Heavily corroded cooling passages.



#### 14. Stator Jacket / Cooling Sleeve

Stator Sleeve Condition: Jacket is corroded from poor cooling water quality.



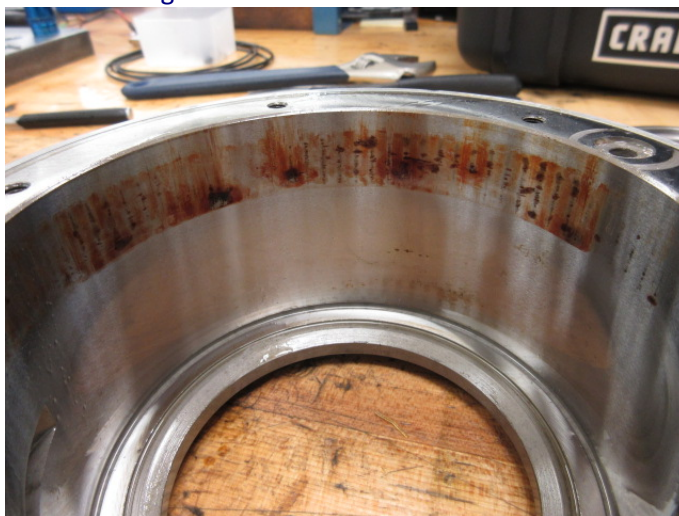
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#### 15. Rear Bearing Carrier

Rear Bearing Carrier Condition:

Minor fretting corrosion in rear carrier.




#### 16. Front Bearing Carrier

Front Bearing Carrier Condition

Not ok. Front carrier cooling passaged plugged and severely corroded.



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16.1 Front Cover / Labyrinth


Damaged from contact in operation.

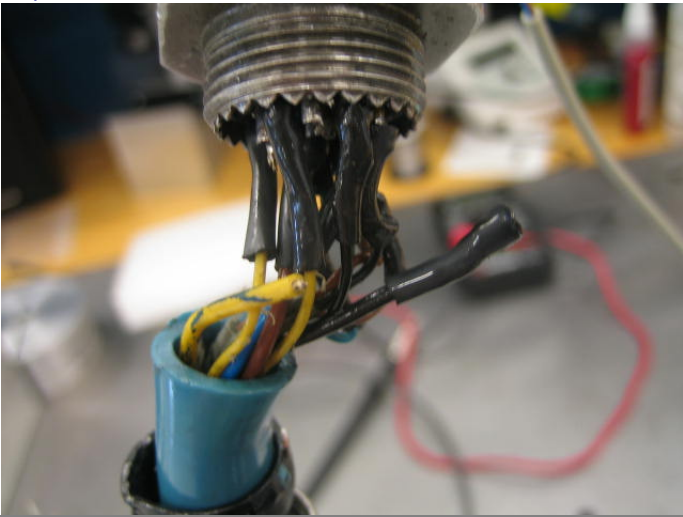



#### 17. Rear Cover

Rear Cover Condition: OK

17.1 Fittings: OK

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17.2 Cables:	<p>Replace oil soaked.</p> 
17.3 Connectors:	<p>Wear and tear but okay to use.</p> 

**Other:**

<b>Report Summary:</b>	Spindle has low clamping force due to broken drawbar springs. Shaft was hard to rotate. Rotary union is worn along with the transition piece driving the union. Encoder signal was out of spec and encoder was heavily contaminated.
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Major components recommended to be replaced:	Cause of component failure:
• Rotary union	Failed bearings.
• Bearings	Fretting corrosion.
• Clamping system	Broken springs, worn gripper.
• Shaft	Fretting corrosion. Shaft will be refurbished.
• Front Bearing Carrier	Corroded.

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•	
•	
<b>Spindle repair recommendations:</b>	
<b>X</b>	Repair and replace all specified damaged and worn components..... See RENEWAL PRICE QUOTE.
	Do not repair. No problems found.
	Repair cost may be excessive (>60% cost of new spindle)..... See RENEWAL PRICE QUOTE.
	Replacement spindle should be quoted as an option ..... See SPINDLE QUOTATION.
	Not able to repair. Replacement spindle should be quoted if available. .... See SPINDLE QUOTATION.
<b>Customer recommendations ( for improved spindle life / performance):</b>	
<ul style="list-style-type: none"> <li>Check coolant quality. Drain and flush system as needed to prevent further spindle damage from cooling system corrosion.</li> </ul>	