

## Perform the blade calibration as per the WKI

### Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**  
**IN THE Nacelle:**

Do the blade calibration. Original calibration may be altered during component replacement, such as position sensors (Balluf), cables, proportional valves and hub computer.

Use below document during manual pitching in the Nacelle Mode.

Also refer to Blade Pitch System Test.

Relevant documentation	
Description	DMS No.
Blade Position Calibration - Section 5.10.9	<a href="#">0000-9925</a>
Blade Pitch System Test	<a href="#">0002-0467</a>

## Replace the defective power net

### Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**  
**IN THE HUB:**

Check for any loose connections at the power net (Pos: G401).

Check input and output voltage 230/115VAC /24VDC

If defective replace the power net.



Part number for power net:

Relevant spare parts	
Description	Item No.
PS ADC 5483R-3 10A-27,4 NM PIN	<a href="#">188453</a>

Relevant CIM case		
CIM case	Task list	SWI
<a href="#">1390</a>		

## Replace the defective Pitch position sensor and defective cables

### Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**

#### IN THE HUB :

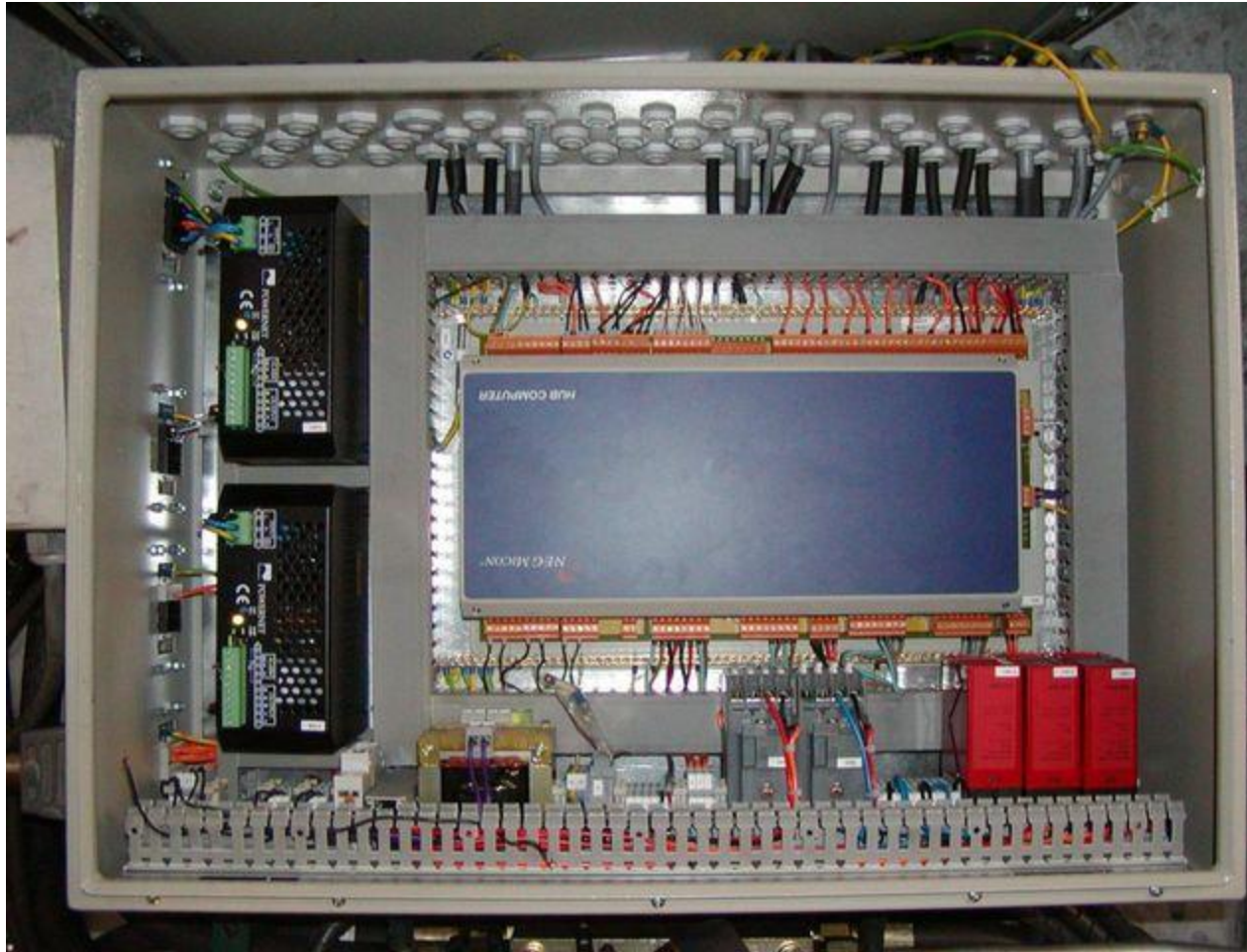
Check for any loose connections in the hub computer terminal X19.

Check for any loose connections on the Blade position sensor.

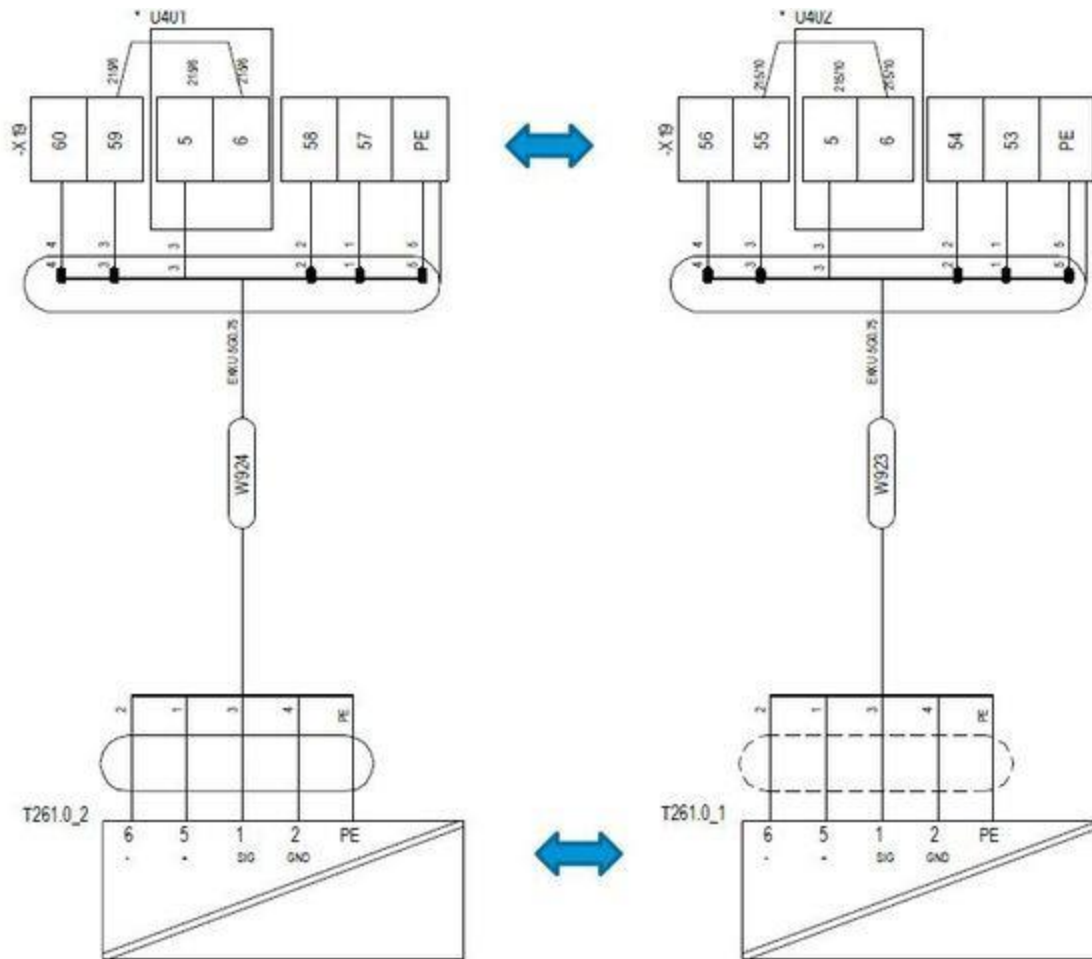




Swap the signal wire to the position transducer (Balluff) on the hub computer. If the fault follows to the new blade then the fault is either in the position transducer or one of the cables.



In the example below, we are swapping the plugs between blades C and B.



Place the cables back to their original position and then swap pitch position sensor from affected blade to another working blade.

If the alarm follows the valve to the other blade, the pitch position sensor is defective.

If it does not, the pitch position sensor is likely not the cause.

#### Pitch position sensor Item number:

**Relevant spare parts**

Description	Item No.
TRANSDUCER BTL5-E10-M0950-A-S	<a href="#">60098816</a>



**Service Module Item Number:**

Relevant spare parts	
Description	Item No.

SERVICEMODUL, BTL5 - E10	<a href="#">60102394</a>
--------------------------	--------------------------



Check the cable for any or short due to the cable rubbing near the hub casting or friction between the cable and the hydraulic hose.

Replace any defective cables.

**Pitch position sensor cable Item Number:**

Relevant spare parts	
Description	Item No.
Cable W 923 Pos.transducer1 Std	<a href="#">60101018</a>
Cable W 924 Pos.transducer 2 Std	<a href="#">60101148</a>
Cable W 925 Pos.transducer 3 Std	<a href="#">60101149</a>

**Check the blade bearing greasing system and replace the failed components**

**Does this solve the problem?**

1] Yes

2] No

3] I don't know

- **Explanation**  
**IN THE HUB:**

Manually operate the grease pump from the controller.

Check that the grease reaches all lubrication points on all blades.

Relevant documentation	
Description	DMS No.
Service Instruction for Lubrication Unit for Blade Bearings	<a href="#">1001450</a>

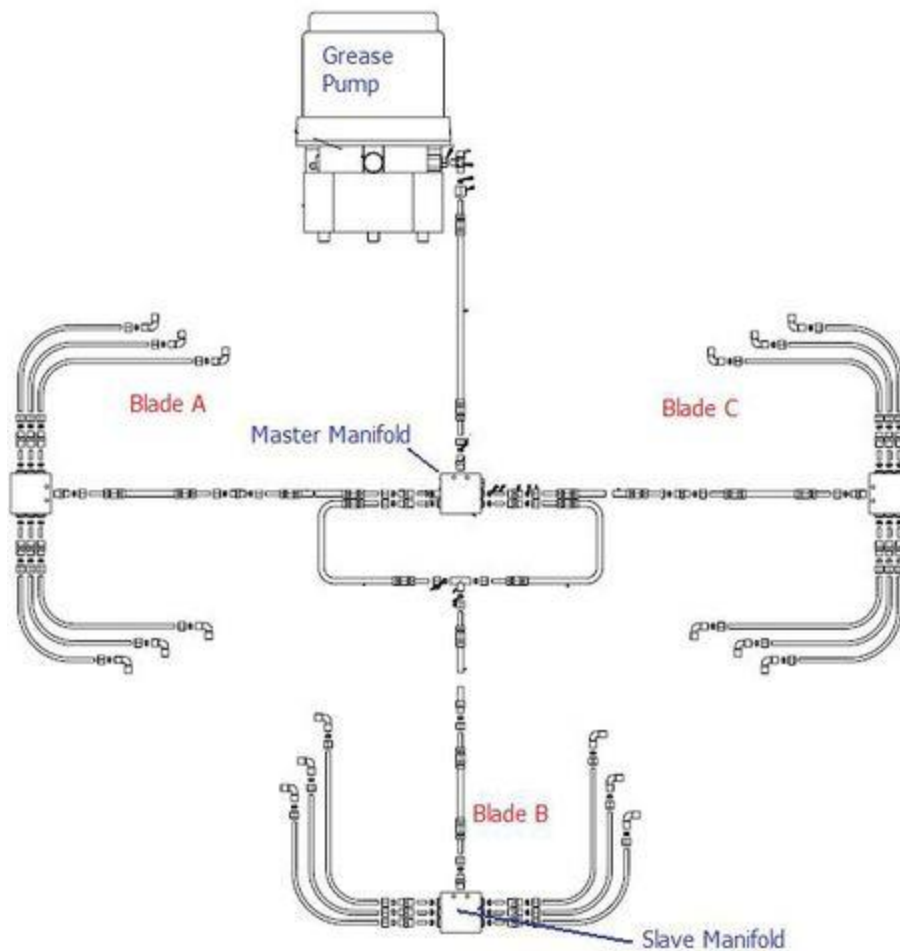
Check that the grease flows from all of the ports:



Inspect for any damaged hose fittings, manifold grease blockage or hose damage.

If necessary replace the manifolds and hoses.

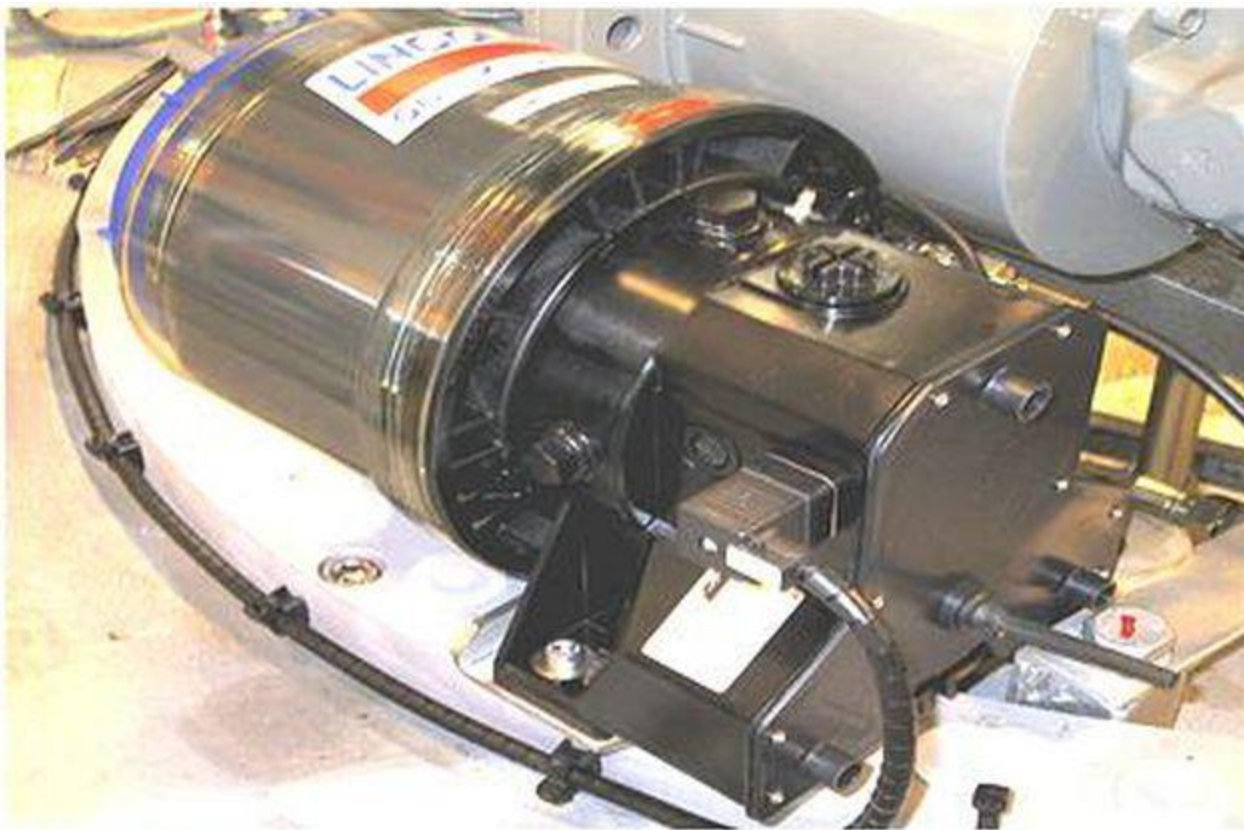
**Blade bearing greasing system:**



Part number details for Blade bearing Greasing system:

**Part number for Grease pump alone:**

Relevant spare parts	
Description	Item No.
GREASE PUMP P203 std.( with Molykote2+ grease)	<a href="#">60112213</a>
GREASE PUMP P203 ARCTIC ( with Fuchs Stabyl LT50 grease)	<a href="#">60067070</a>



**Part number for Grease pump with main manifold and hoses**

( does not include blade hoses& manifolds)

Relevant spare parts	
Description	Item No.
PUMP - BRG. GREASING SYS - STD	<a href="#">60073006</a>



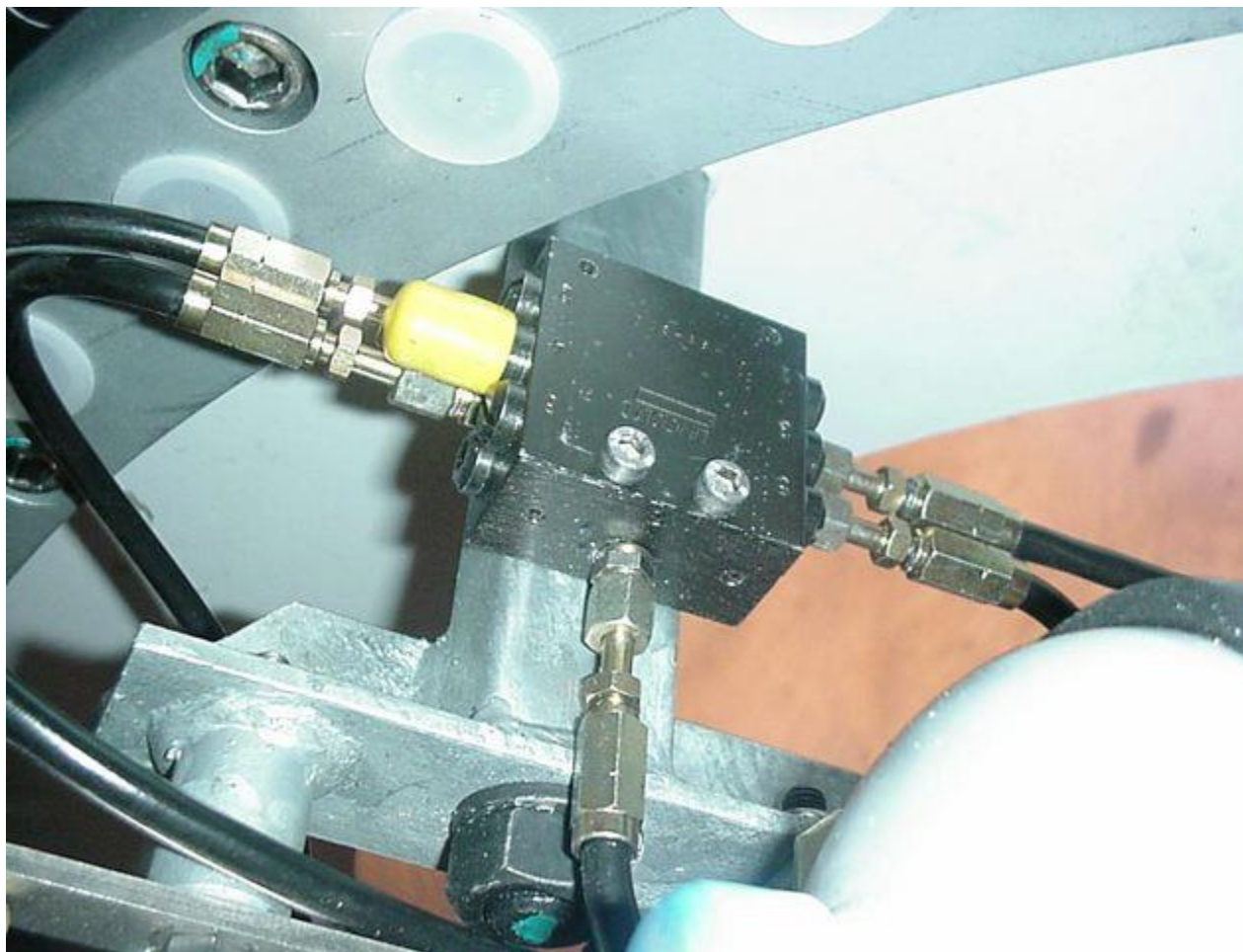
Part number for full set of Slave manifolds (3 EA) with hose and accessories:

Relevant spare parts	
Description	Item No.
WING PL BRG. GREASING SYS –STD	<a href="#">60094070</a>



Sub - Part number details for hose accessories

COMPONENT	DESCRIPTION	QUANTITY PER	UM	Remarks
60067073	METERING DEVICE "PRIMARY"	1,000	EA	Distributor Manifold
60080996	GREASE HOSE ASSEMBLY (1210 MM.	1,000	EA	Hoses from pump to Distributor manifold to Slave Manifold
60080997	GREASE HOSE ASSEMBLY (390MM)	2,000	EA	
60080998	GREASE HOSE ASSEMBLY (7840 MM.	2,000	EA	
60080999	GREASE HOSE ASSEMBLY (6290 MM.	1,000	EA	
60111921	Protective hood /m.strop red	1,000	EA	Fittings& Accessories for above hose&Manifold
60111922	Elbow LL6MMx1/8K	1,000	EA	
60112211	Check valve 1/6, high pressure	4,000	EA	
60112212	Protective cap f. quick fittin	4,000	EA	
60067074	METERING DEVICE "SECONDARY"	1,000	EA	Slave Manifold (for 1 blade)
60067085	HOSE 1/6 x 320MM (CUT LENGTH)	1,000	EA	Hoses from Slave manifold to Blade bearing (for 1 blade)
60067086	HOSE 1/6 x 490MM (CUT LENGTH) S	1,000	EA	
60067087	HOSE 1/6 x 1200MM (CUT LENGTH)	1,000	EA	
60067088	HOSE 1/6 x 1380MM (CUT LENGTH)	1,000	EA	
60067089	HOSE 1/6 x 2080MM (CUT LENGTH)	1,000	EA	
60067090	HOSE 1/6 x 2250MM (CUT LENGTH)	1,000	EA	
60112212	Protective cap f. quick fittin	6,000	EA	Fittings& Accessories for above hose&Manifold (for
60112214	Quick fittings 90 elbow 1/6	6,000	EA	

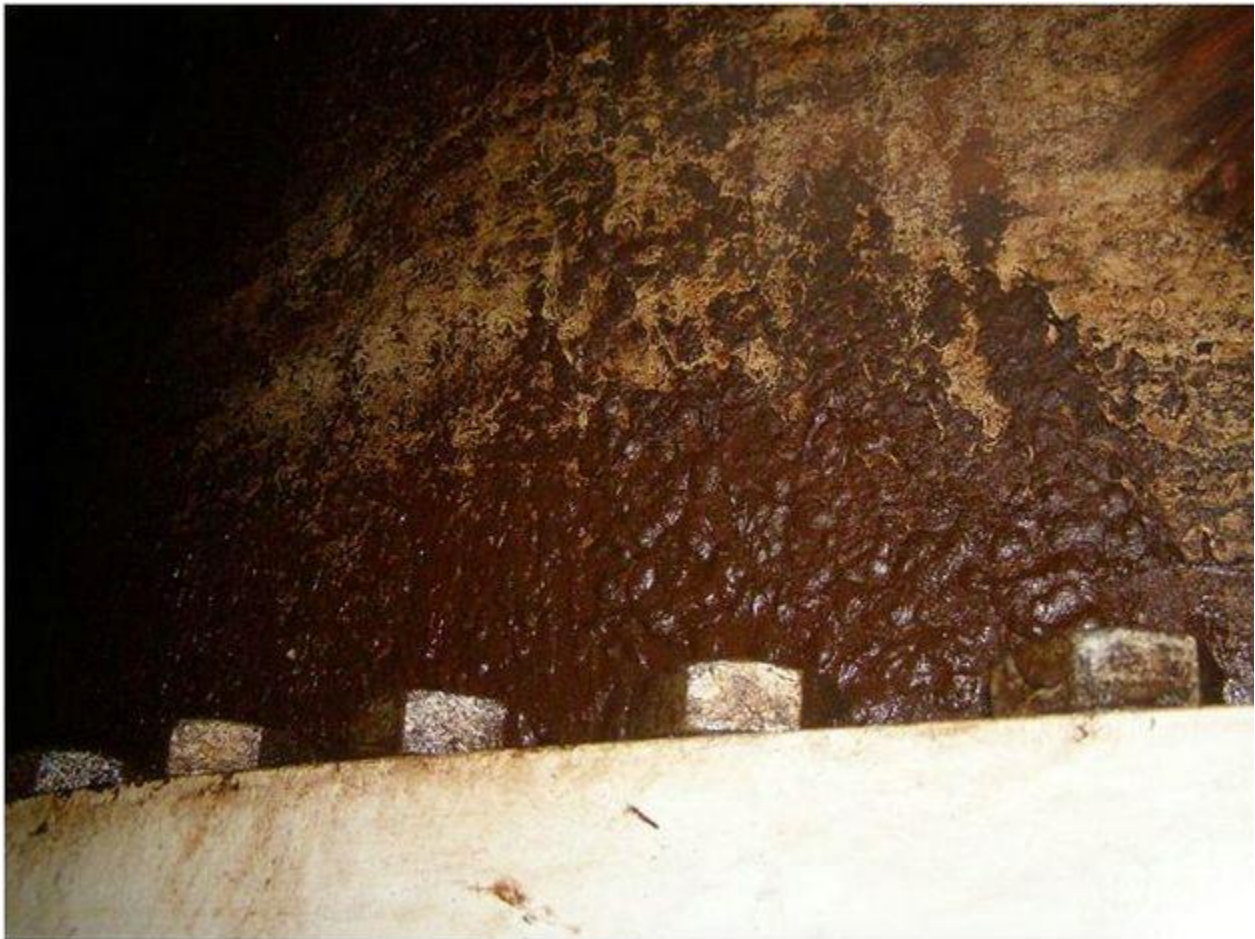


**Check for blade bearing grease leaks:**

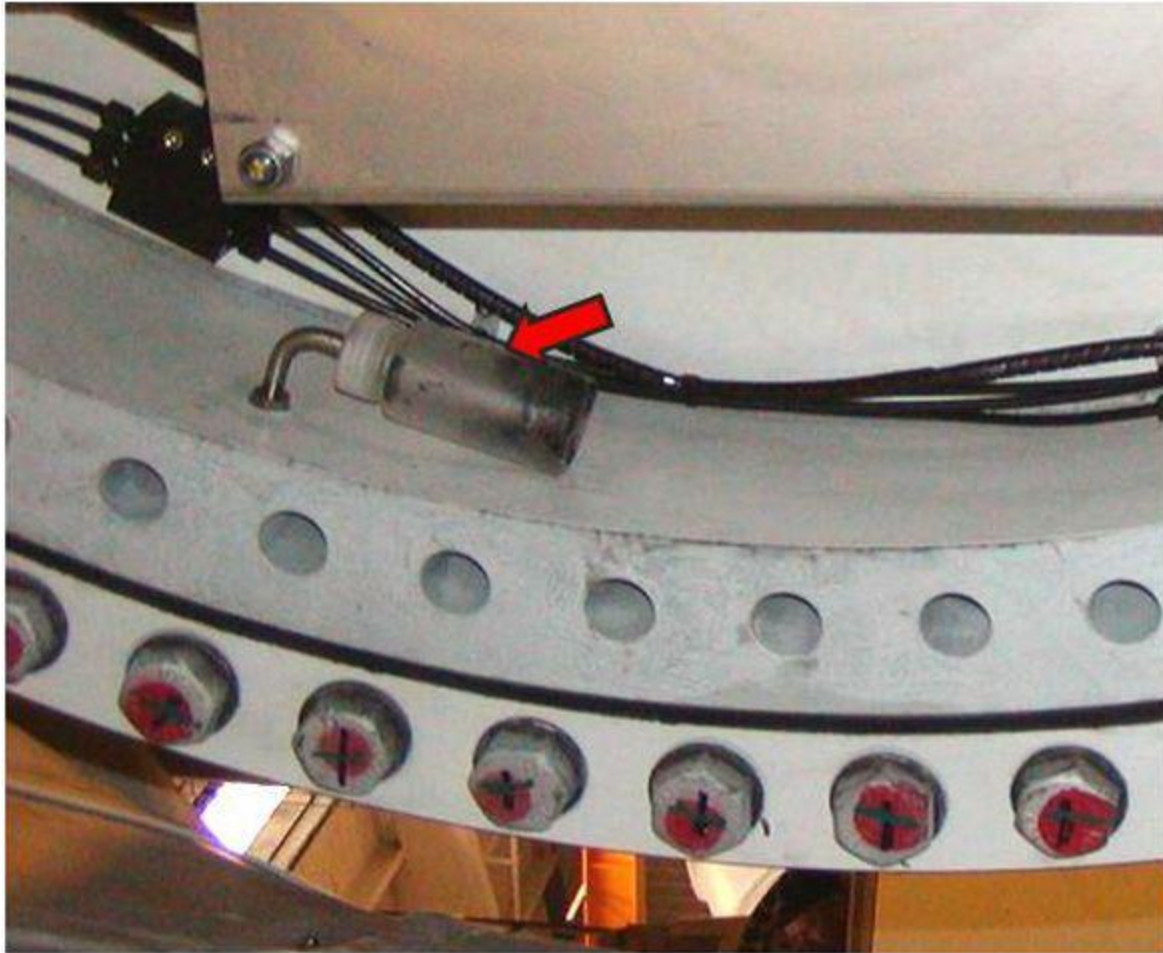
Check blade bearings for any grease leak.

Check the hydraulic system for any leaks, isolate and repair any leaks that are found.

Check for grease or oil stains on the blades and spinner.



Check the grease collector bottles in all blade roots. If there is a large volume of oil in the hub or evidence that oil has penetrated into the bearing, perform a manual greasing operation on all of the blades.



Relevant documentation	
Description	DMS No.
Blade Bearing Manual Grease Procedure	<a href="#">0024-9719</a>

Check the inner and outer blade bearing seals.

If there is any damage or heavy grease leak replace the seals.

Relevant documentation	
Description	DMS No.
Installation of IMO Retrofit Inner Blade Bearing Seal	<a href="#">0002-2266</a>

Relevant documentation	
Description	DMS No.
Replacement of Outer IMO Blade Bearing Seal	<a href="#">0003-1177</a>



### Replace the defective Hub Computer

Does this solve the problem?

- 1] Yes
- 2] No
- 3] I don't know

- **Explanation**  
**IN THE HUB:**

If after the blade calibration, pitch angles deviate, or angle values show constant when pitching the blades, the hub computer may be defective.

**Relevant spare parts**

Description	Item No.
SIF HUB COMPUTER CABINET EVOII	<a href="#">51701801</a>

Relevant CIM case		
CIM case	Task list	SWI
<a href="#">1594</a>	12511	

Check for Surge protector upgrade in Power net as per Document:

Relevant documentation	
Description	DMS No.
Test Proj_Adnl Elec Prot_V82	<a href="#">0013-3681</a>
Add_Elec_Protec_V82	<a href="#">0033-3872</a>



**Check the accumulator pre-charge pressure and recharge the accumulators**

**Does this solve the problem?**

- 1] Yes
- 2] No
- 3] I don't know

- **Explanation**  
**IN THE HUB:**

Check all of the pitch accumulator pre-charge pressures.

If any of the nitrogen pressures in the accumulators are low, recharge.

**Relevant documentation**

Description	DMS No.
Charging of Nitrogen Accumulators	<a href="#">941918</a>

If the bladder in the accumulator has failed, replace the accumulator.

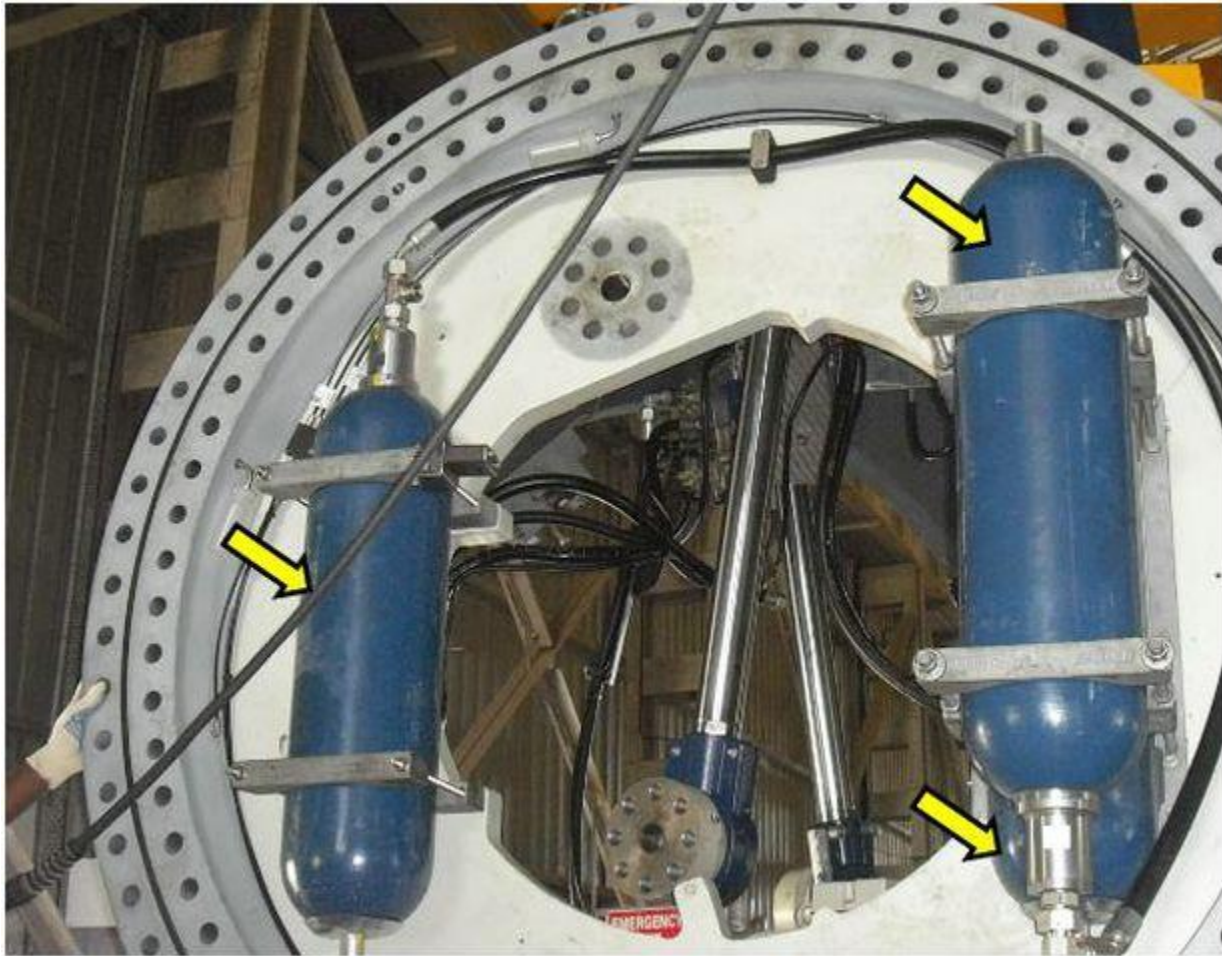
Relevant spare parts	
Description	Item No.
HYDR ACCU 20 L 115 BAR DUAL (NM72)	<a href="#">60113096</a>
HYDR ACCU 24.5 L 115 BAR DUAL (V82 other than Australia)	<a href="#">60113097</a>
HYDR ACCU 24.5 L 115 BAR AS1210 (V82 Australia)	<a href="#">60113098</a>

Relevant CIM case		
CIM case	Task list	SWI
<a href="#">1168</a>		0002-0199

Relevant documentation	
Description	DMS No.
Blade Accumulator Exchange	<a href="#">0001-2871</a>

Check accumulator retrofit installation

Relevant documentation	
Description	DMS No.
Accumulator Retrofit Installation	<a href="#">0000-9402</a>



**Replace the defective proportional valve and cables**

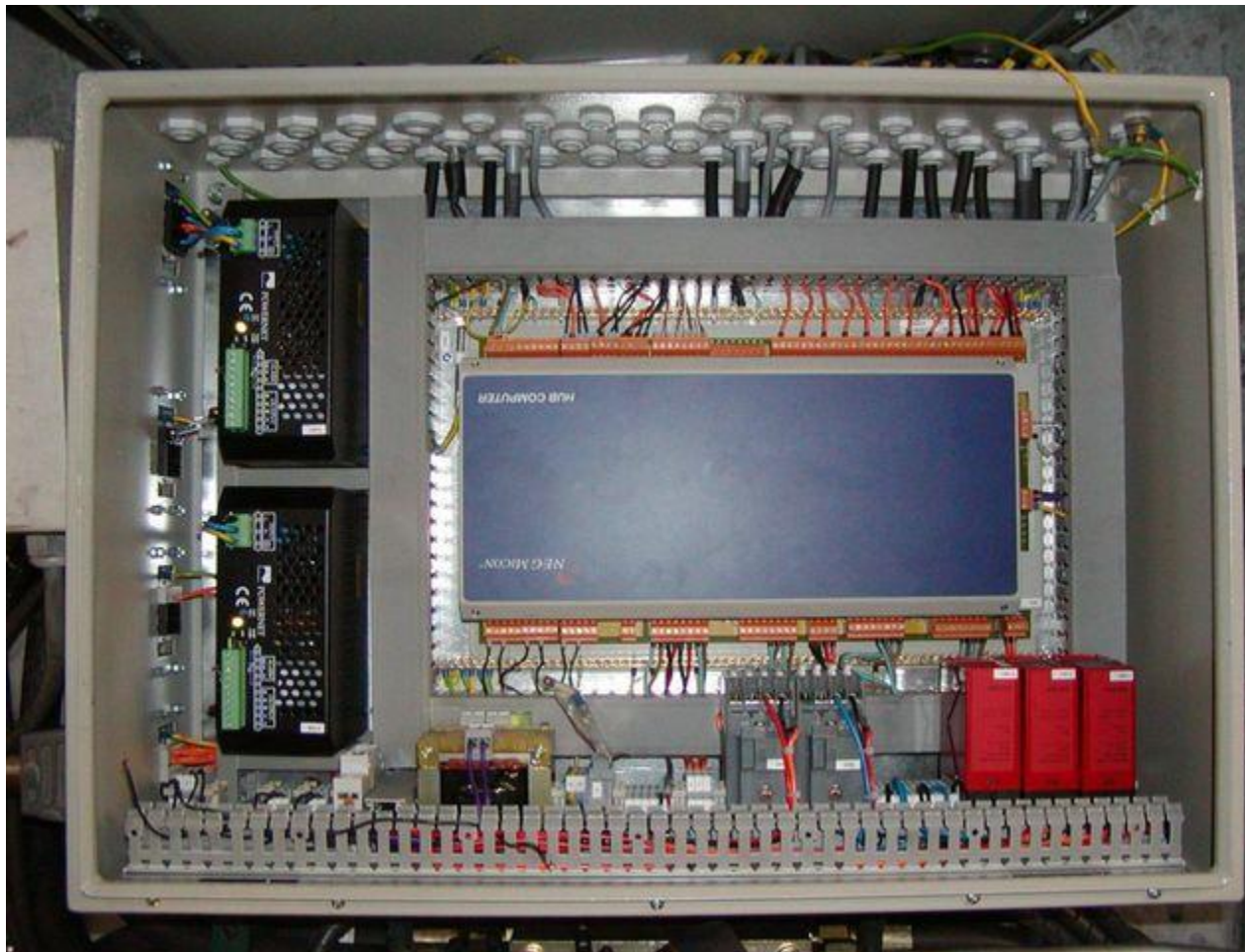
**Does this solve the problem?**

- 1] Yes
- 2] No
- 3] I don't know

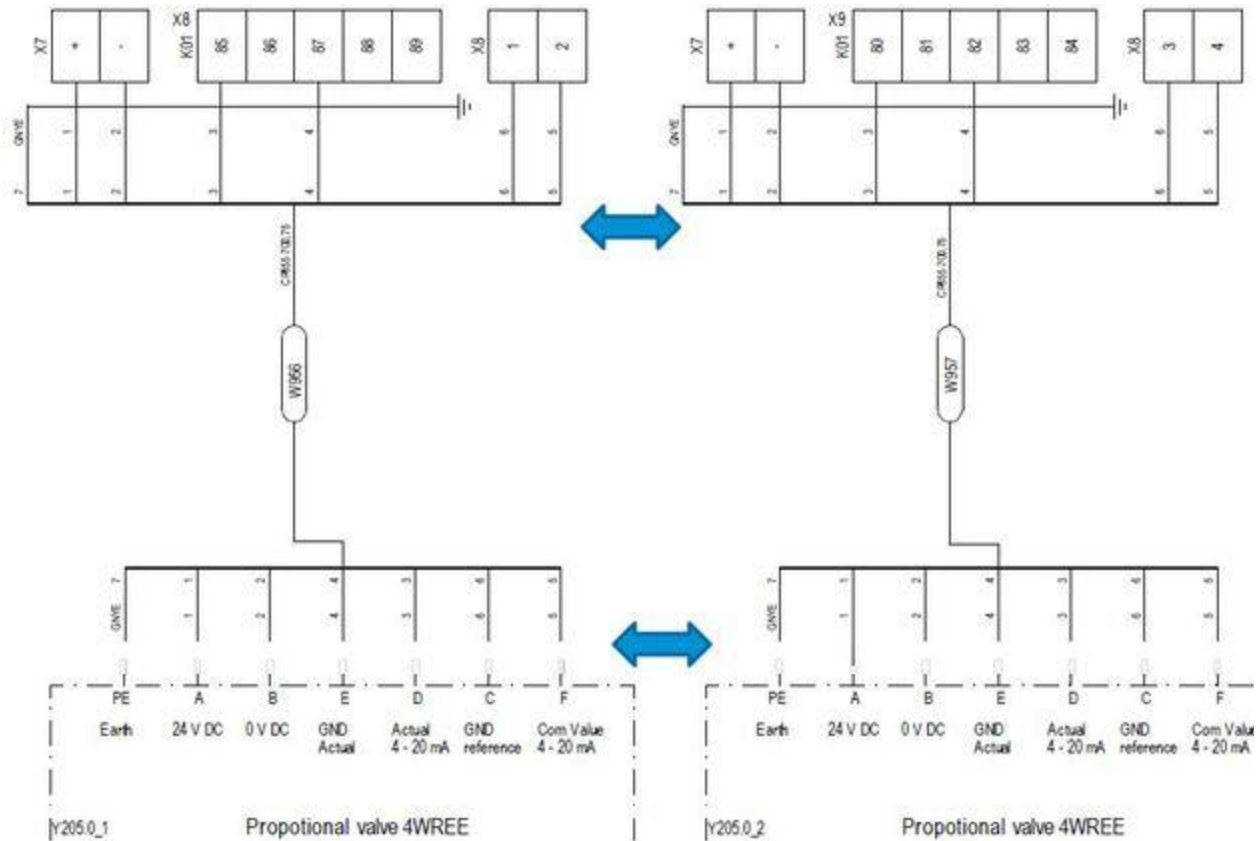
- **Explanation**  
**IN THE HUB:**

First swap the signal wire to the proportional valve on the hub computer.

If the fault follows to the new blade then the fault is either in the proportional valve or one of the cables.



In the example below, we are swapping the plugs between blades A and B.



Place the cables back to their original position and then swap proportional valve from affected blade to another working blade.

If the alarm follows the valve to the other blade, the proportional valve is defective.

If it does not, the proportional valve is likely not the cause.

For Parker proportional valves check to see the color of the LED on the valve circuit board.

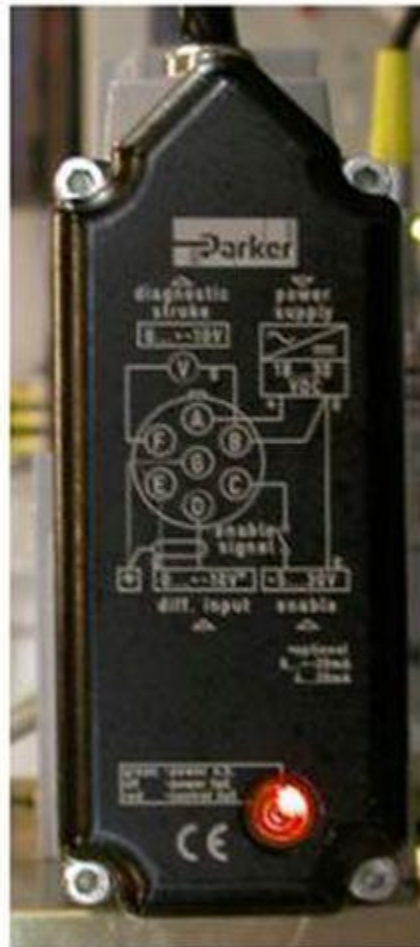
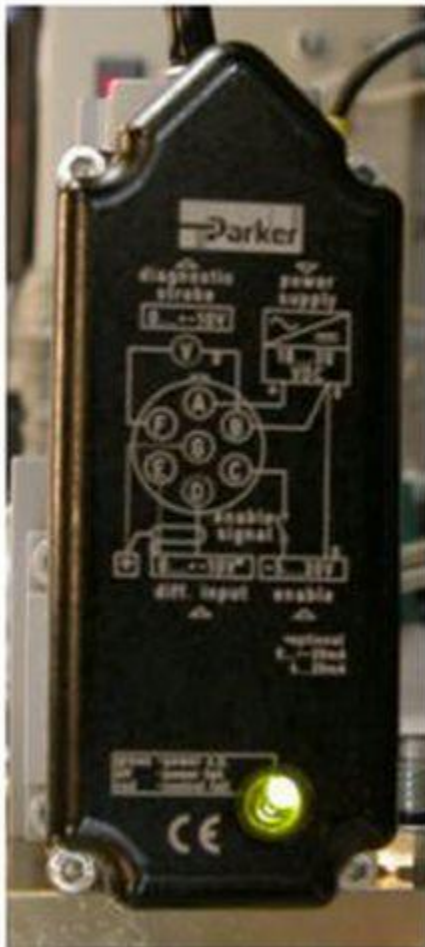
Parker hydraulics SWI below

**Relevant documentation**

Description	DMS No.
V82 Hydraulic pitch control system	<a href="#">0001-3199</a>

The LED should be green with the pitch system pressurized.

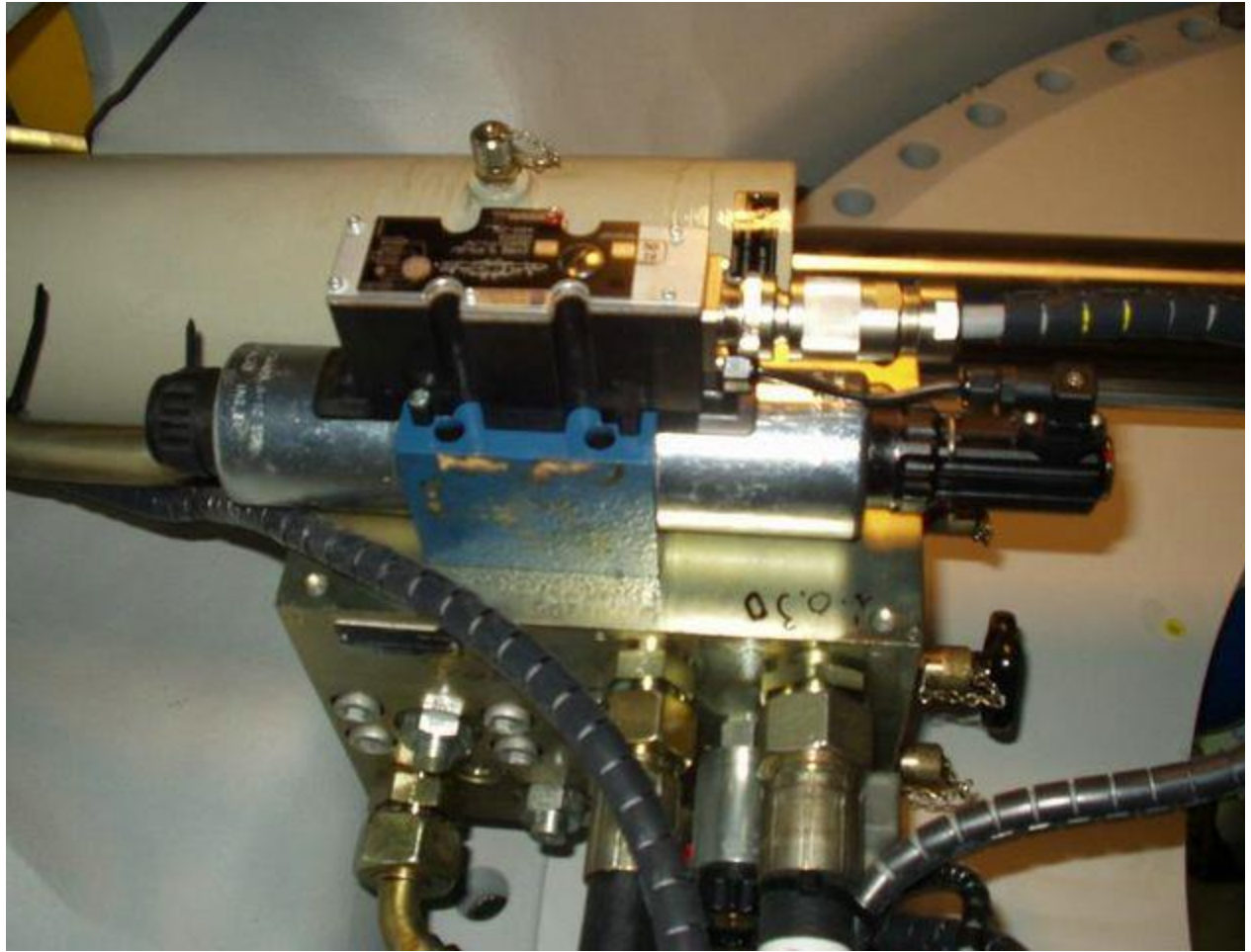
If it is red and there is pressure verified on test port MP, then the valve may also be defective.



Display Color	Indicates
Green	Normal operation
Off	Supply voltage outside permissible range of 18 to 30 VDC
Red	Spool position error / Low pilot pressure

Replace proportional valve using SWI below:

Relevant documentation	
Description	DMS No.
Proportional Valve Replacement	<a href="#">0016-1690</a>





### Parker Proportional Valve

Relevant CIM case		
CIM case	Task list	SWI
<a href="#">2303</a>	14333	

Relevant spare parts		
Brand	Description	Item No.

Parker	PROP. VALVE D31FHE01C	<a href="#">60112621</a>
--------	-----------------------	--------------------------

#### Rexroth Proportional Valve

Relevant CIM case		
CIM case	Task list	SWI
<a href="#">1914</a>	14334	

Relevant spare parts		
Brand	Description	Item No.
Rexroth	PROP VAL 4WREE 10R75-2X/G24K31	<a href="#">60078979</a>

#### Part number for Proportional valve Cable:

Relevant spare parts	
Description	Item No.
Cable W 957 Proportional valve Y0205.0-2	<a href="#">60021545</a>

#### Part number for Valve cables:

Relevant spare parts	
Description	Item No.

Cable W 944 Parking valve Y 210.0-2	<a href="#">60021536</a>
Cable W 945 Shutdown valve Y215.O-2	<a href="#">60021537</a>

Relevant documentation	
Description	DMS No.
Change of valve in Parker pitch manifold	<a href="#">0002-4365</a>



Swap POS. 215 Solenoid valve with one from another blade.

If the valve operates normally, replace the original faulty valve.

#### Part Number for Solenoid Valve

The part No.60096475 is phased out and henceforth replaced by 109795 & 60106201.

#### (Rexroth) Valve/Solenoid- 215

Relevant spare parts		
Description	Item No.	Status
SOL VAL KSDEU1CA/HCG24N0K4M	<a href="#">60096475</a>	Phased out
ELECTRIC SEAT VALVE	<a href="#">109795</a>	Available
COIL GZ37-4 24VDC 19W	<a href="#">60106201</a>	Available



**60106201**



#### Relevant spare parts

Description	Item No.
3/2 DIRECTIONAL VALVE	<a href="#">60111617</a>

#### Perform the blade bearing operation

#### Does this solve the problem?

1] Yes

2] No

3] I don't know

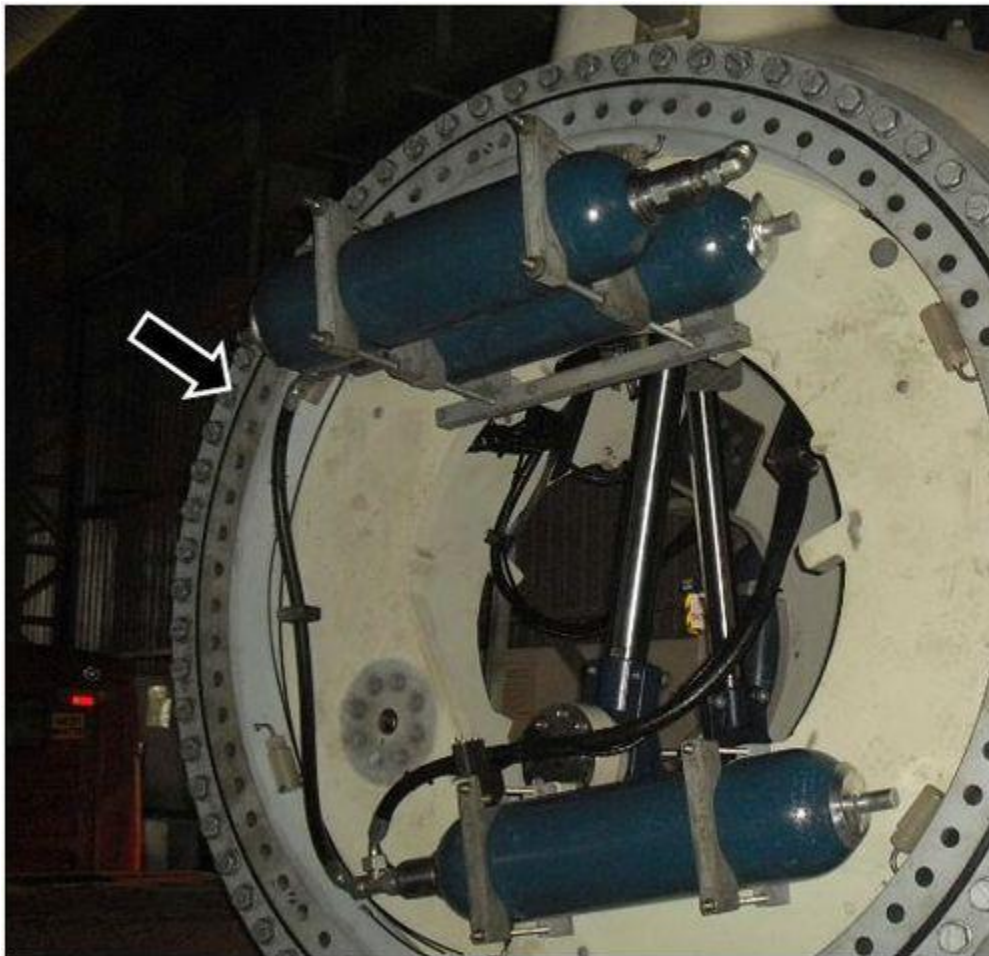
- **Explanation  
IN THE HUB:**

Check the Blade bearing operation 'Pitching to run' and 'Pitching to stop'.

Check for any blade vibration or any abnormal noise during operation.

Perform the Blade Pitch System Test

Relevant documentation	
Description	DMS No.
Blade Pitch System Test	<a href="#">0002-0467</a>



If manual greasing does not solve the issue, likely it is the cause of blade bearing failure. Consult the SBU

Engineering group to determine course of action and correct item number for the applicable blade bearing.

CIM1908 : Pitch bearing\_IMO\_NM\_Bearing seal leakage

CIM929 : Pitch bearing\_RE (IMO)\_NM\_Bearing sealing is leaking

Relevant CIM case		
CIM case	Task list	SWI
<a href="#">1908</a>	16781,16782	
<a href="#">929</a>	16781,16782	

**Part number for Blade bearing:**

Relevant spare parts	
Description	Item No.
BLADE BEAR. STD. IMO -NEW SEAL	<a href="#">60113392</a>
BLADE BEARING STD LAULAGUN	<a href="#">60104445</a>