Perform the blade position 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 any component replacement like position sensors (Balluf), cables, proportional valves and hub computer.

  DMS: 0000-9925 section 5.10.9 Blade Position Calibration during manual pitching in the Nacelle Mode.

  also refer to the Blade Pitch System Test **DMS :0002-0467**

Relevant documentation	
Description	**DMS No.**
Blade Position Calibration	0000-9925
Blade Pitch System Test	0002-0467

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 the all pitch accumulator pre-charge pressure

  If any low pressure accumulators recharge it

Charging of Nitrogen Accumulators

Relevant documentation	
Description	**DMS No.**
Charging of Nitrogen Accumulators	941918

If any failure accumulator replace with new:

Relevant spare parts	
Description	**Item No.**
HYDR ACCU 20 L 115 BAR DUAL (NM72)	60113096
HYDR ACCU 24.5 L 115 BAR DUAL (V82 other than Australia)	60113097
HYDR ACCU 24.5 L 115 BAR AS1210 (V82 Australia)	60113098

Relevant CIM case		
CIM case	**Task list**	**SWI**
1168		0002-0199

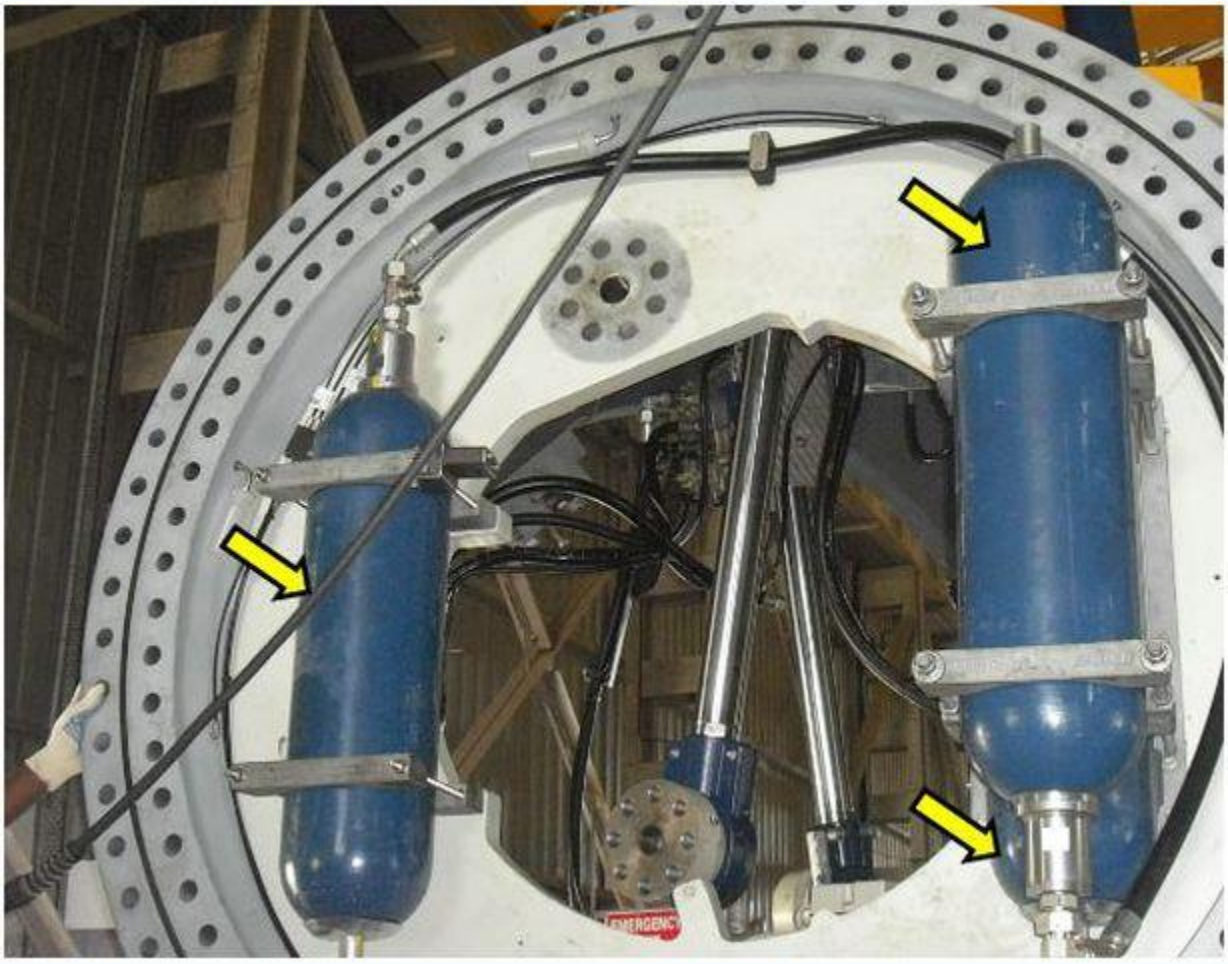
Blade Accumulator Exchange

Relevant documentation	
Description	**DMS No.**
Blade Accumulator Exchange	0001-2871

Check accumulator retrofit installation

Accumulator Retrofit Installation

Relevant documentation	
Description	**DMS No.**
Accumulator Retrofit Installation	0000-9402



Replace the defective pitch position sensor and defective cables

Does this solve the problem?

1] Yes

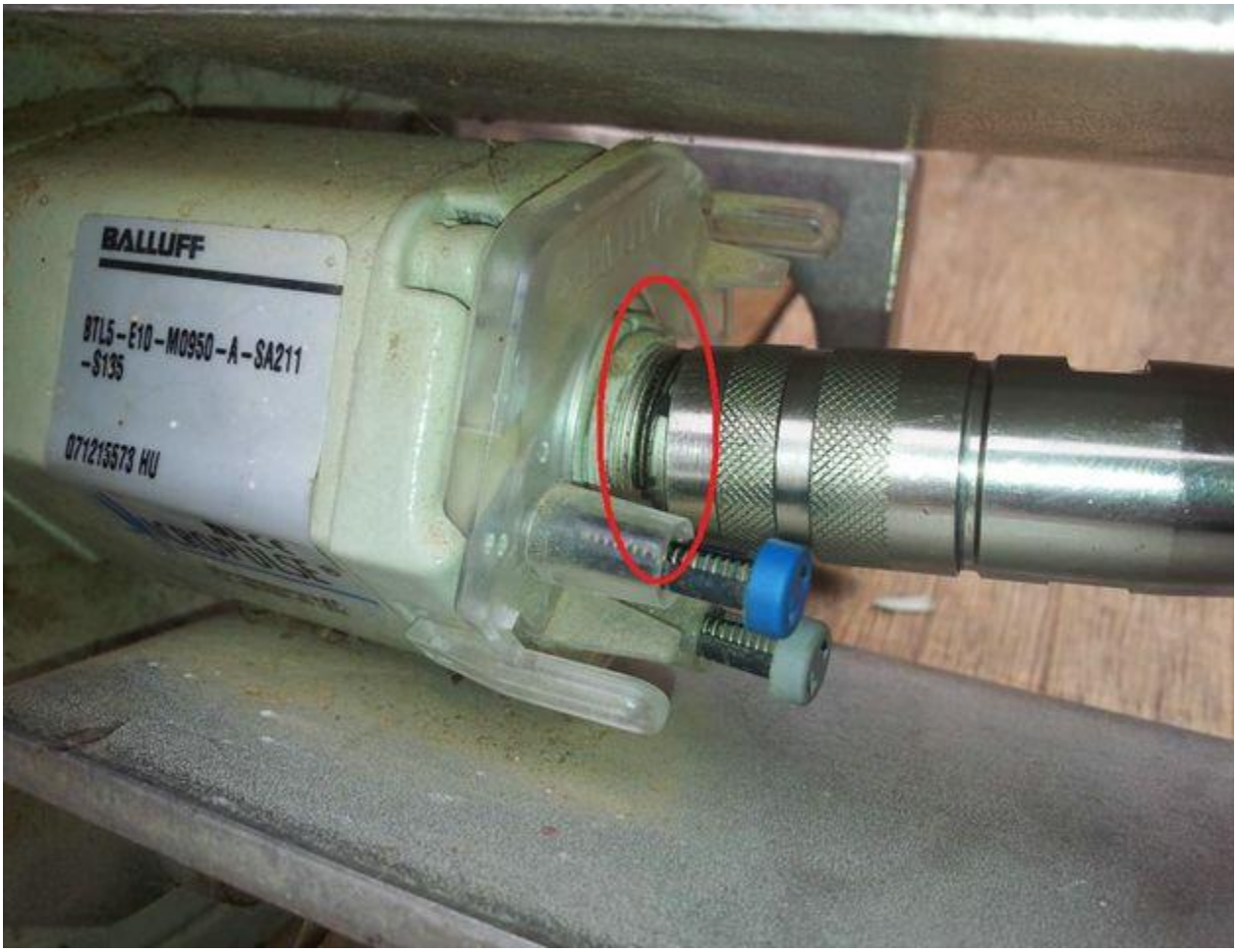
2] No

3] I don't know

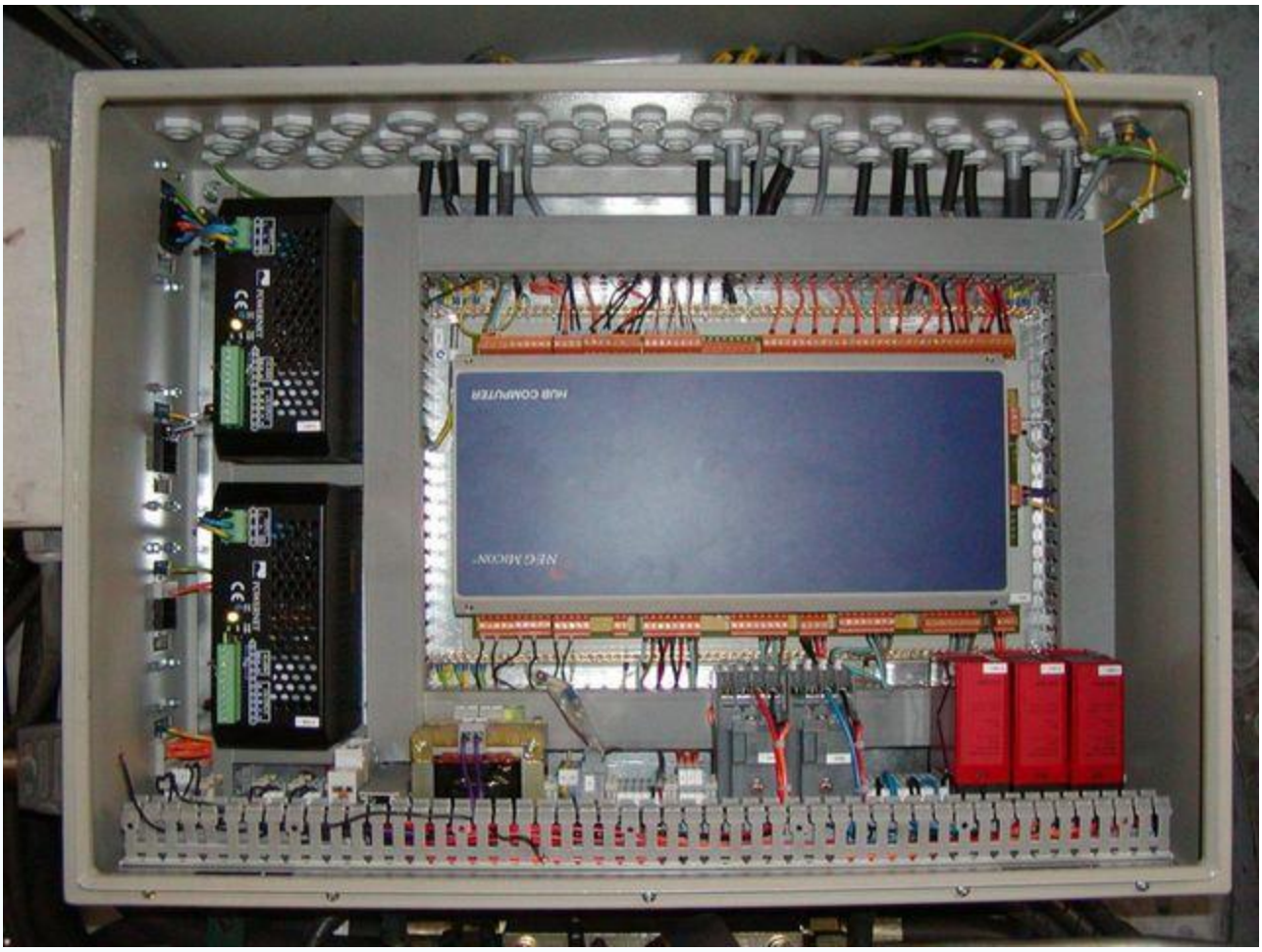
- **Explanation**
  IN THE HUB:

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

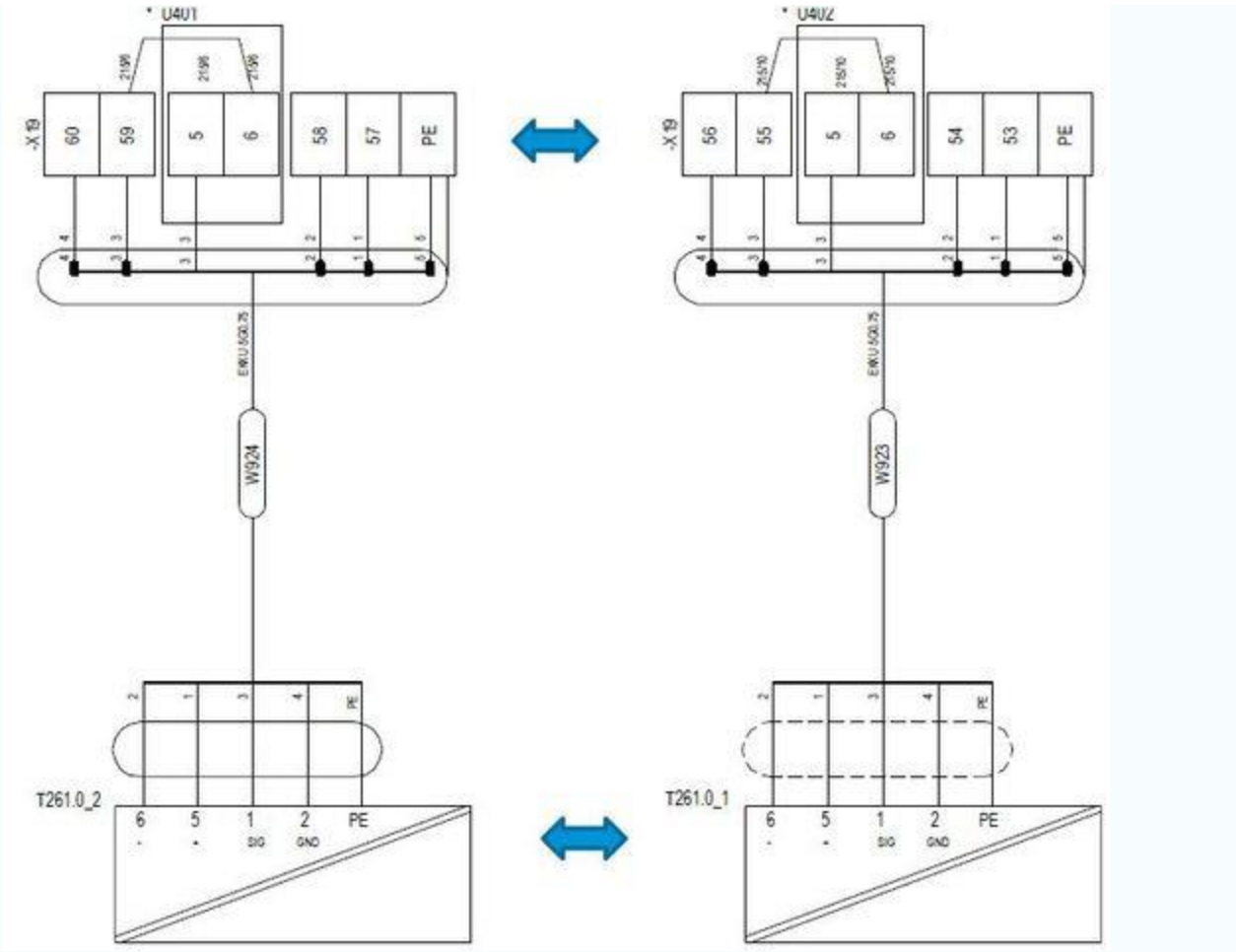
Check for any loose connections for Blade1 position sensor.



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 B and A.



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.

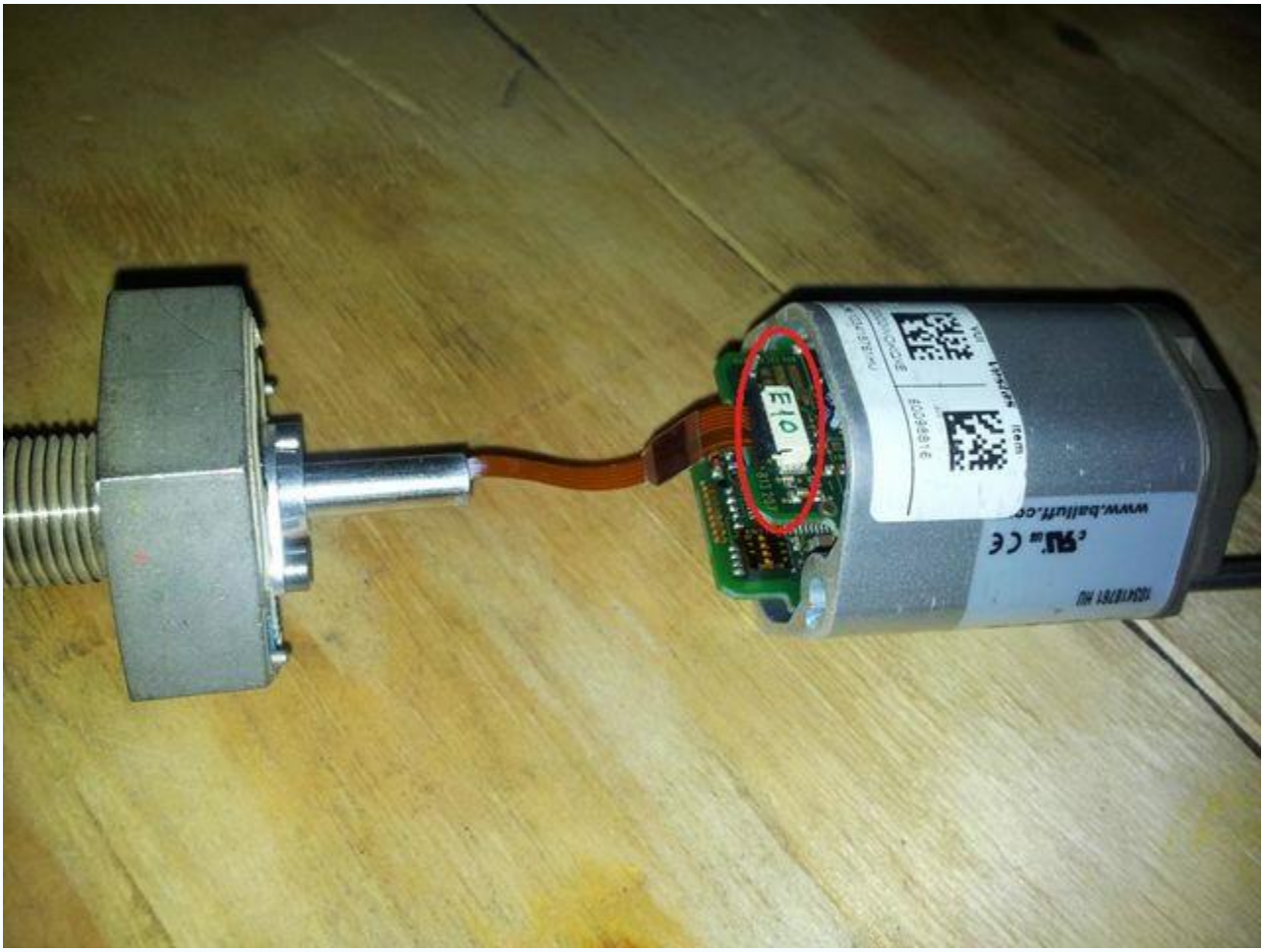
Pitch position sensor Item number :

Relevant spare parts	
Description	**Item No.**

TRANSDUCER BTL5-E10-M0950-A-S	60098816

Service Module Item Number :

Relevant spare parts	
Description	**Item No.**
SERVICEMODUL, BTL5 - E10	60102394



Check the cable for any or short due to the cable rubbing near hub casting or roughly tied and laid on the hydraulic hose may lead to this error.

Replace the cable if it is found to be defective.

Relevant spare parts	
Description	**Item No.**
Cable W 923 Pos.transducer1 Std	60101018
Cable W 924 Pos.transducer 2 Std	60101148
Cable W 925 Pos.transducer 3 Std	60101149

Replace the defect hydraulic valves and cables

Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**

IN THE HUB:

Relevant documentation	
Description	**DMS No.**
Change of Valve in Parker Pitch Manifold	0002-4365
Distribution Manifold Replacement	0021-3758

If any one bade pitch pressure drops –check the affected blade pitch hydraulic system.

Refer the hydraulic diagrams

Relevant documentation	
Description	**DMS No.**
Pitch Hydraulic circuit (Rexroth) Pitch manifold Diagram	5003025
Pump-manifold for Hub frame. Rexroth	5002046
Pitch Hydraulic circuit (Parker) Pitch manifold Diagram	5003013

REXROTH SYSTEM -PITCH MANIFOLD:

Check the below valve positions.

Swap the valves one by one in to other manifolds and check valve operation.

If the fault shifts to other blades the valve is likely defective. If not continue to check the other valves.

Part number for valves

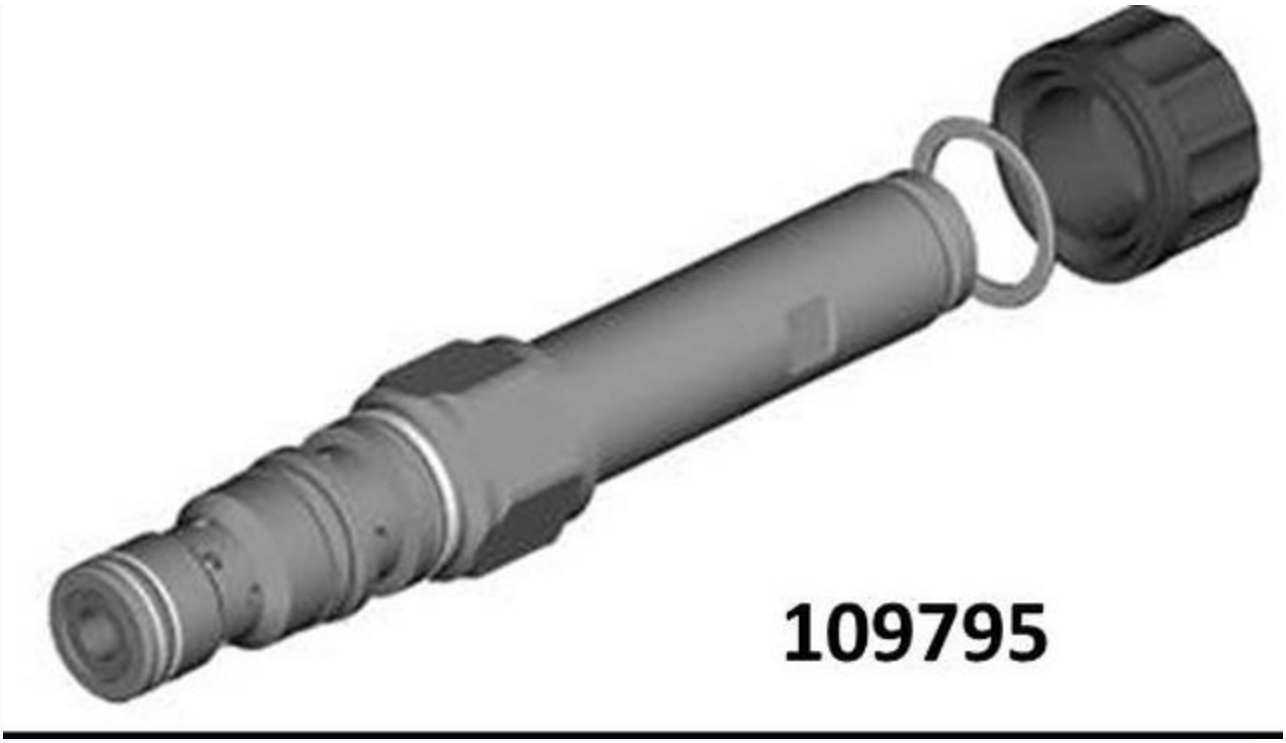
Relevant spare parts		
Description	**Item No.**	**Valve No.**
THROTTEL VAVLE NFCC-LCN A40122	105103	222
PROP VAL 4WREE 10R75-2X/G24K31	60078979	205
PRESSURE CONTROLVALVE:RDDT-QWN	60096477	220
CHECK VALVE: M-SR 15 KE02-1X/	60096479	225
CHECK VALVE: CXFA-XFN A30314JG	60096480	226
CHECK VALVE PILOT:CVEV-XCN A30	60096481	230, 235, 250
VALVE CHECK PILOT COFA-XAN A30	60096493	240, 245

Part Number for Solenoid Valve

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

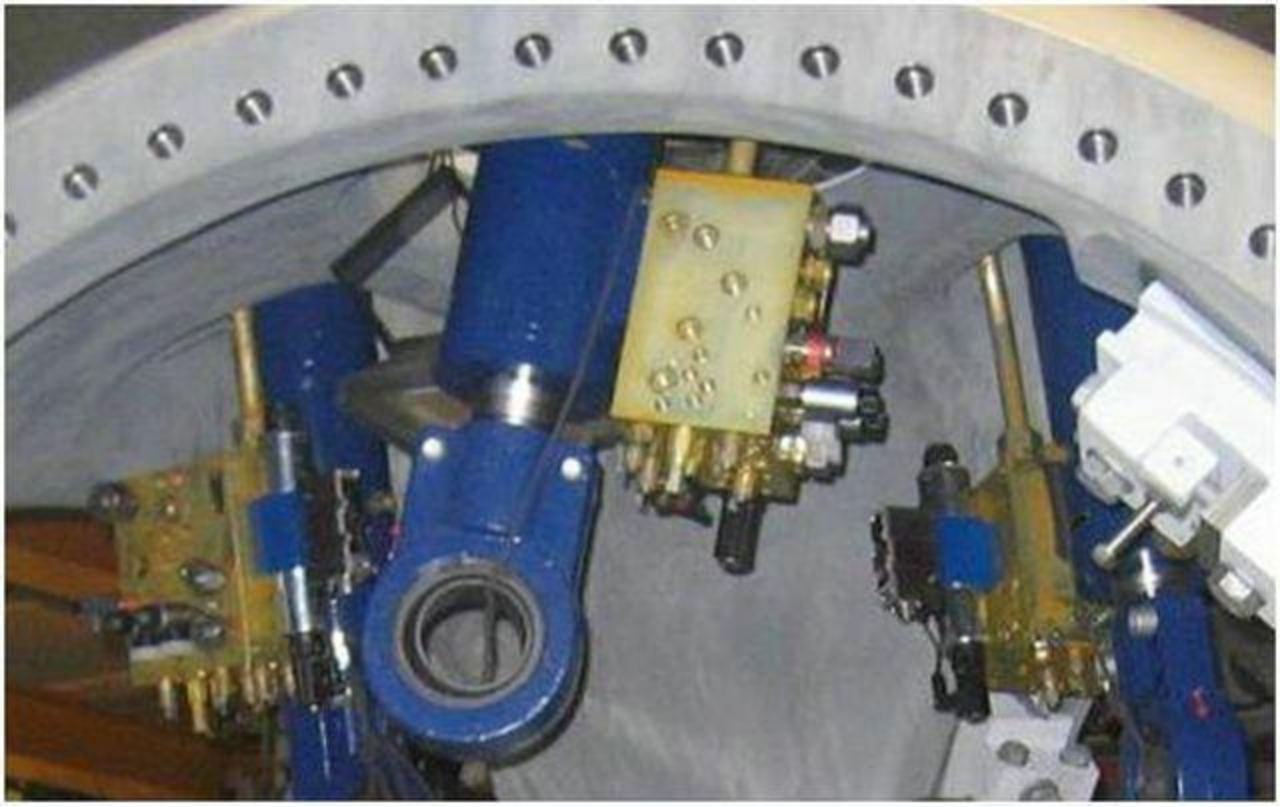
(Rexroth) Valve/Solenoid- 215

Relevant spare parts		
Description	**Item No.**	**Status**
SOL VAL KSDEU1CA/HCG24N0K4M	60096475	Phased out
ELECTRIC SEAT VALVE	109795	Available
COIL GZ37-4 24VDC 19W	60106201	Available



(Parker) 3/2 DIRECTIONAL VALVE

Relevant spare parts	
Description	**Item No.**
3/2 DIRECTIONAL VALVE	60111617



PARKER SYSTEM -PITCH MANIFOLD:

Check the below position valves,

Swap the valves one by one in to other manifolds and check valve operation.

If fault shifted to other blades the valve likely defect. If not, check the other valves.

Part number for valves

Relevant spare parts		
Description	**Item No.**	**Valve No**
CHECK VALVE PILOT:CVEV-XCN A30	60096481	230, 250
3/2 DIRECTIONAL VALVE	60111617	210, 215
LOGIC ELEMENT PIL. OPERATED	60111630	240, 245

PRESSURE CONTROLVALVE:RDDT-QWN	60096477	220
CHECK VALVE CVH103P20	60112628	235
PROP. VALVE D31FHE01C	60112621	205

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, any pitch angles deviate, or angle values show constant when pitching the blades, the hub computer may defective.

Relevant spare parts	
Description	**Item No.**
SIF HUB COMPUTER CABINET EVOII	51701801

Relevant CIM case		
CIM case	**Task list**	**SWI**
1594		

Check for the surge protector upgrade in Power Net as per Doc **0013-3681** or **0033-3872.**

Relevant documentation	
Description	**DMS No.**
0013-3681_Test Proj_Adnl Elec Prot_V82	0013-3681
Add_Elec_Protec_V82	0033-3872

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:

Check the blade bearing greasing system

Check the grease flow in all blades

Service Instruction for Lubrication Unit for Blade Bearings

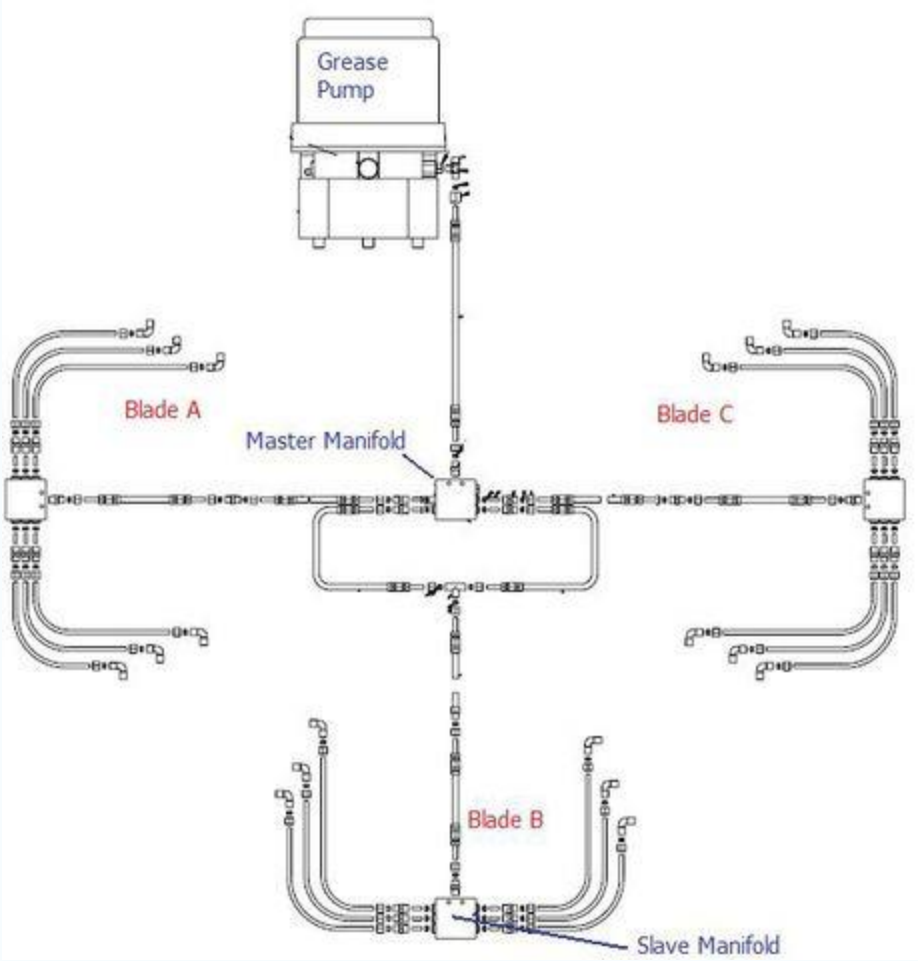
Relevant documentation	
Description	**DMS No.**
SI_Auto lub for blade bearing NM82	1001450

Check the grease flows to all the ports.

Check for any improper hose fitting, manifold grease blockage and 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)	60112213
GREASE PUMP P203 ARCTIC (with Fuchs Stabyl LT50 grease)	60067070

Part number for Grease pump with main manifold and hoses

(not include blade hoses& manifolds)

Relevant spare parts	
Description	**Item No.**
PUMP - BRG. GREASING SYS - STD	60073006

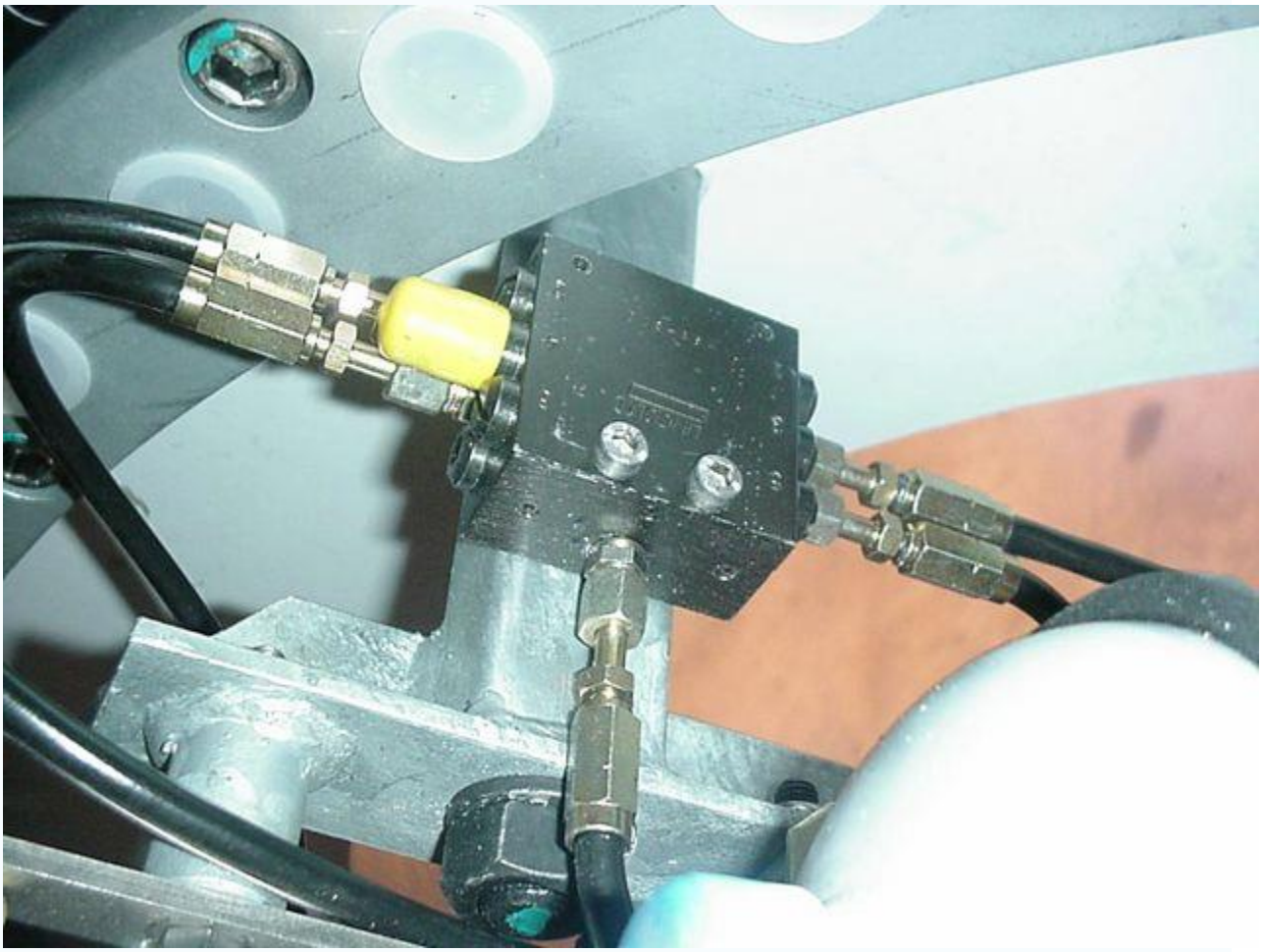
Part number for full set of Slave manifolds (3 EA) with hose and accessories:

Relevant spare parts	
Description	**Item No.**

WING PL BRG. GREASING SYS –STD	60094070

Sub – Part number details for hose accessories

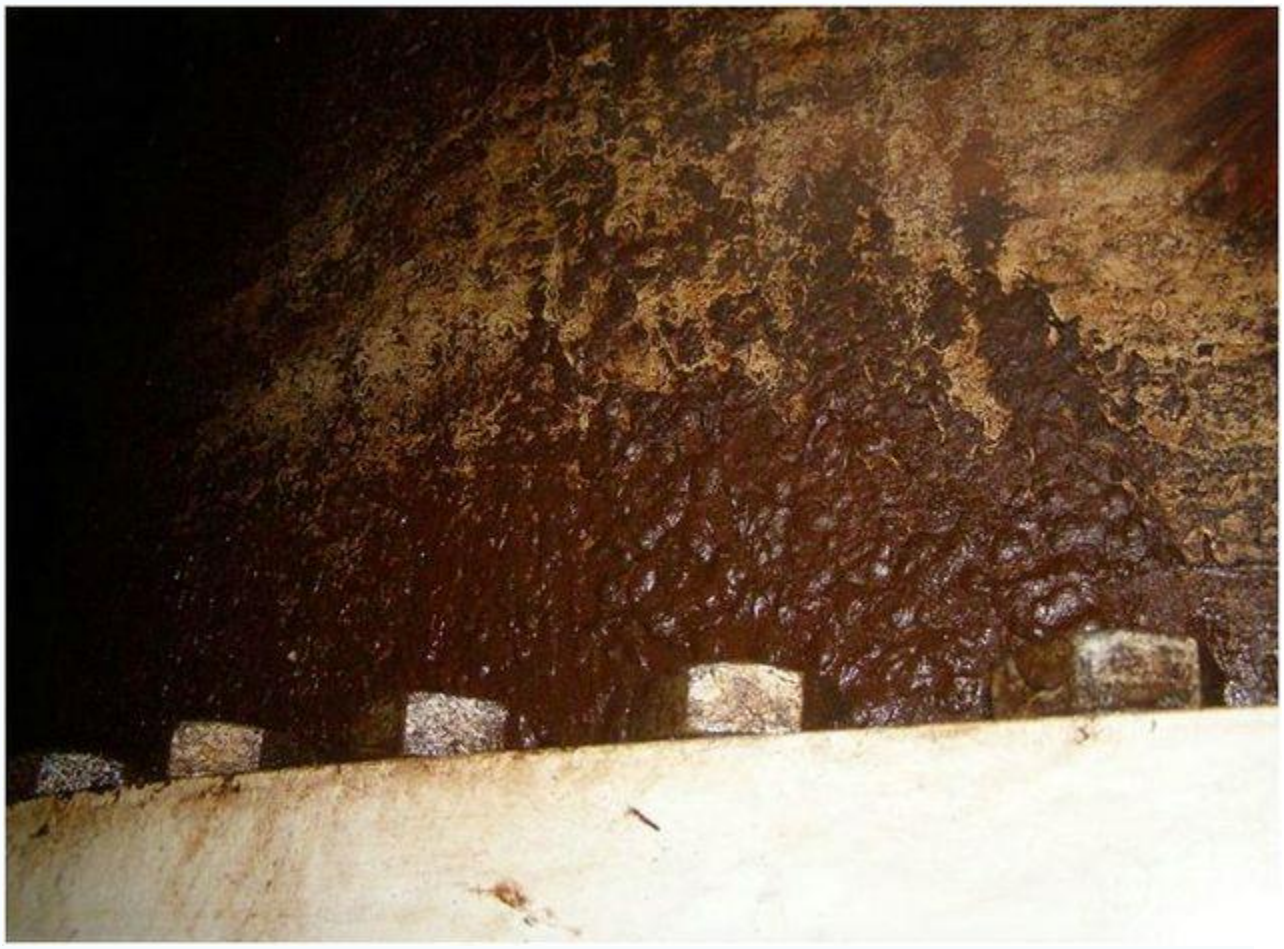
COMPONENT	DESCRIPTION	QUANTITY PER	UM	Remarks
60067073	METERING DEVICE "PRIMARY"	1,000	EA	Distributor Manifold
60080996	GREASE HOSE ASSEMBLY (1210 MM.	1,000	EA	Hoses from pump to Distributor manifold to Slave Manifold
60080997	GREASE HOSE ASSEMBLY (390MM)	2,000	EA	
60080998	GREASE HOSE ASSEMBLY (7840 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 1
60112214	Quick fittings 90 elbow 1/6	6,000	EA	



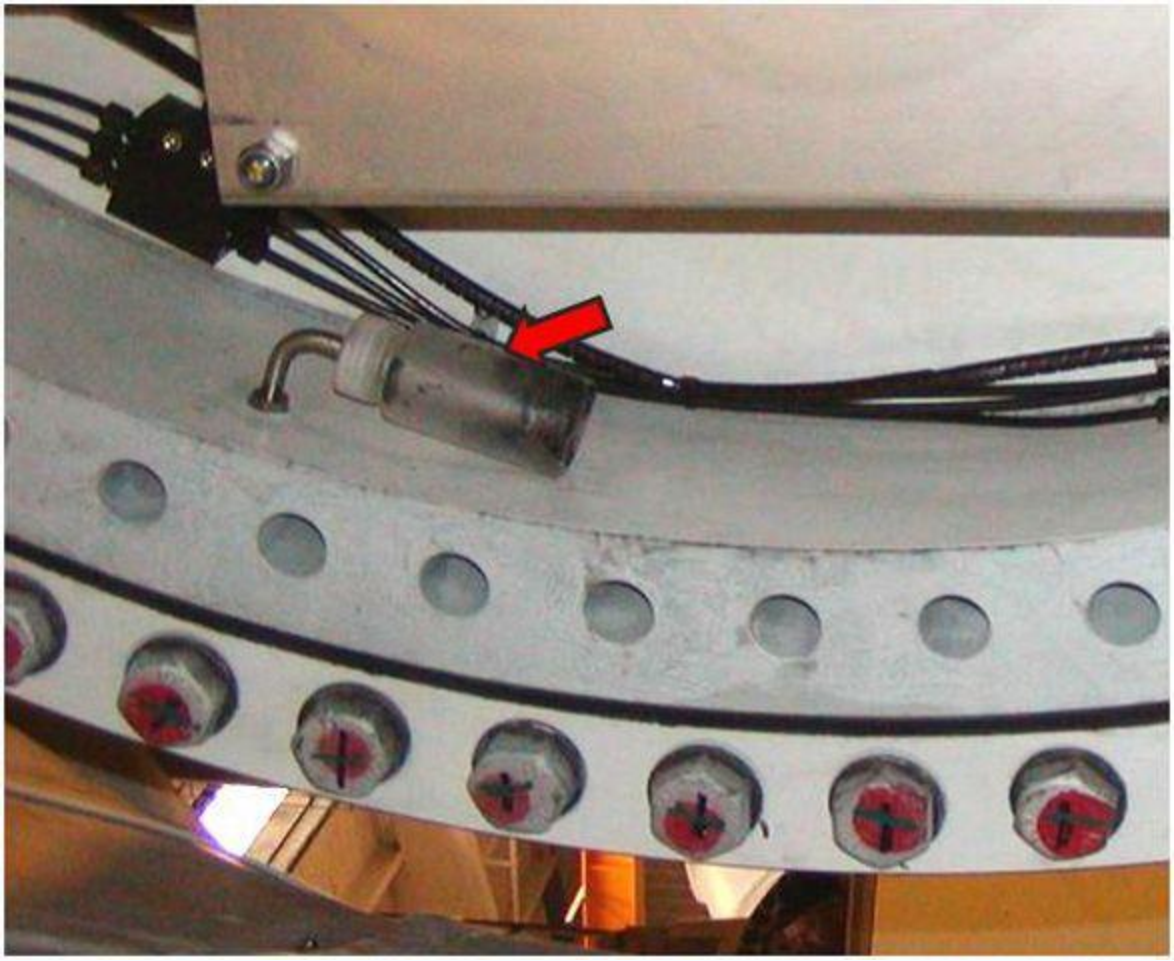
Check for blade bearing grease leak:

Check the all blade bearing for any grease leak.

Check the hydraulic system for any leaks. Repair any leaks in the hydraulic system accordingly.



Check the grease collector bottles in all blade roots.



Apply the grease manually depending on the severity of the grease leak.

Check the blade bearing seal.

If any damage is observed or a heavy grease leak exists replace the seal (if possible).

Replacement of outer IMO Blade Bearing Seal

Relevant documentation	
Description	**DMS No.**

Blade Bearing Manual Grease Procedure	0024-9719
Installation of IMO Retrofit Inner Blade Bearing Seal	0002-2266
Replacement of Outer IMO Blade Bearing Seal	0003-1177

Replace the defective Proportional Valve and cables

Does this solve the problem?

1] Yes

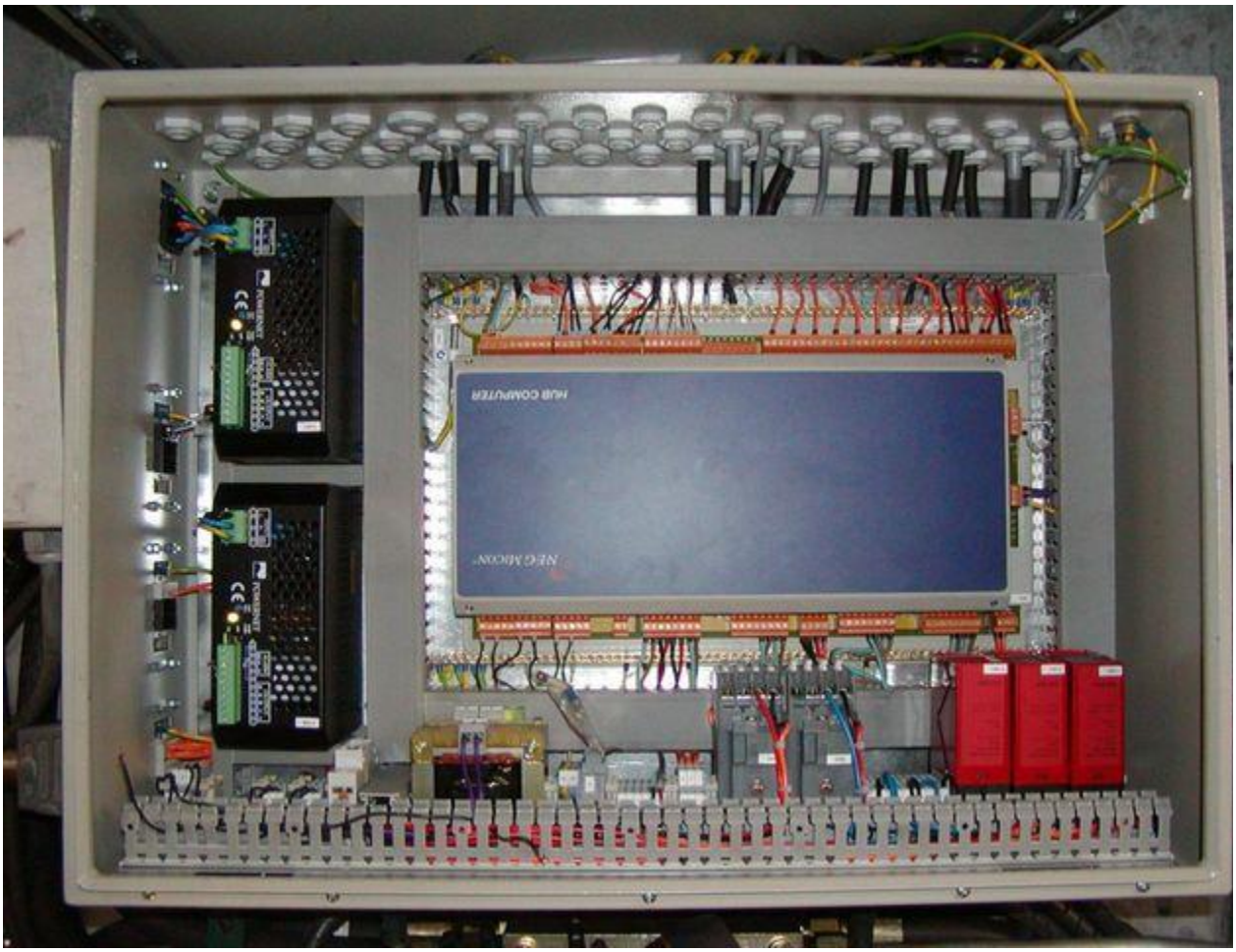
2] No

3] I don't know

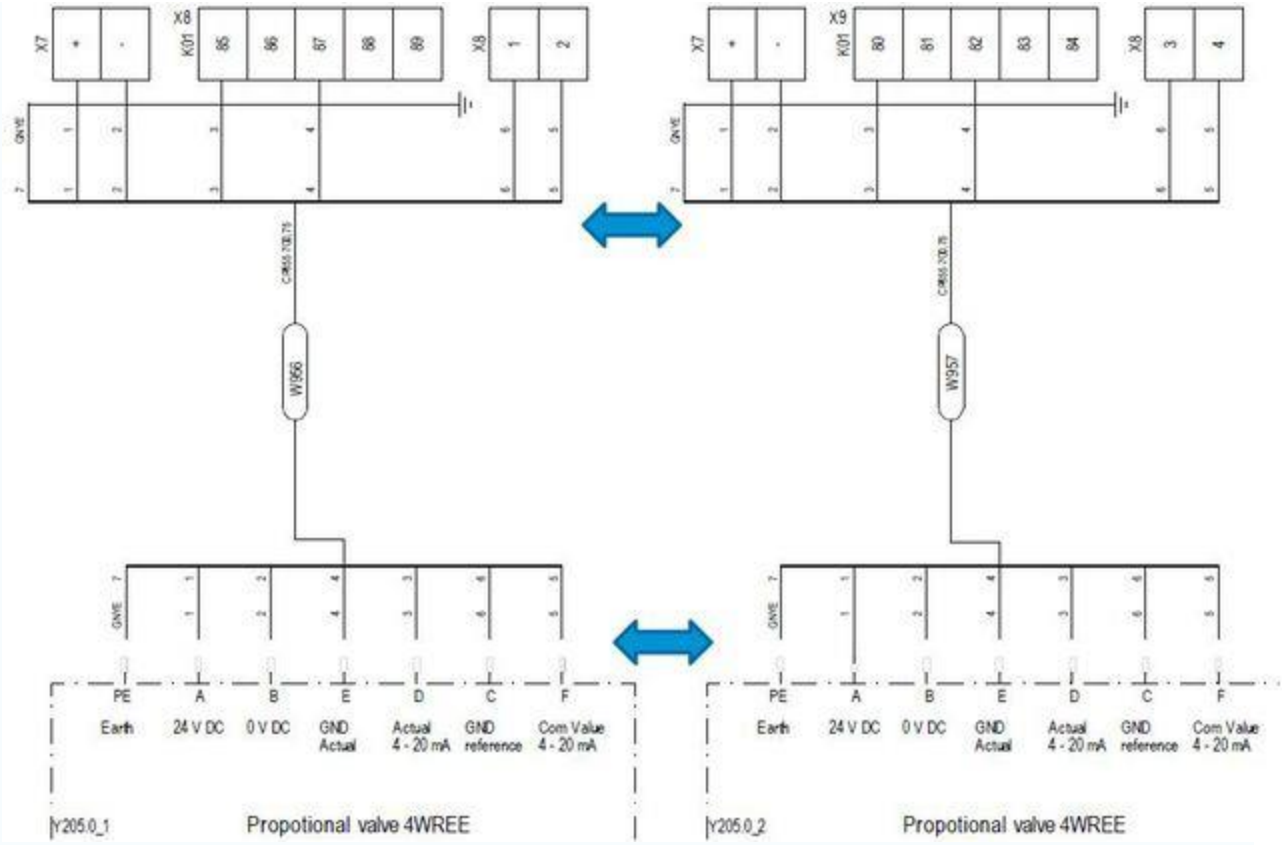
- **Explanation**
  IN THE HUB:

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.

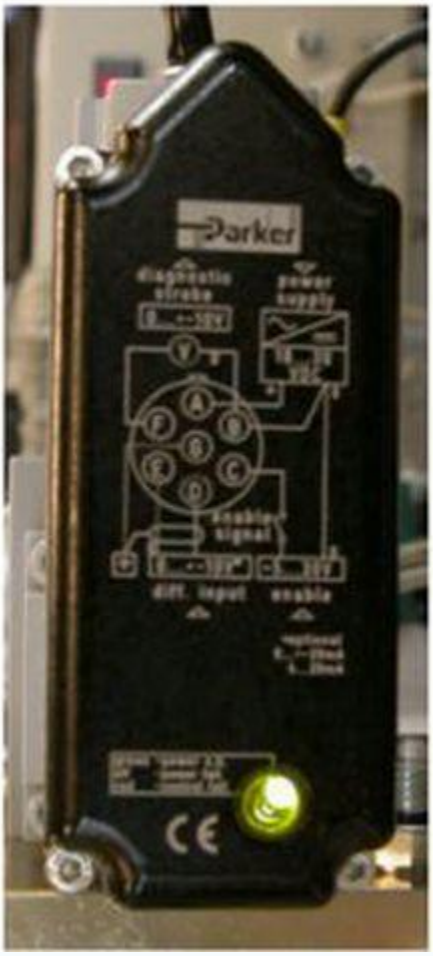
Parker hydraulics SWI below

Relevant documentation	
Description	**DMS No.**

V82 Hydraulic pitch control system	0001-3199

The LED should be green with the pitch system pressurized.

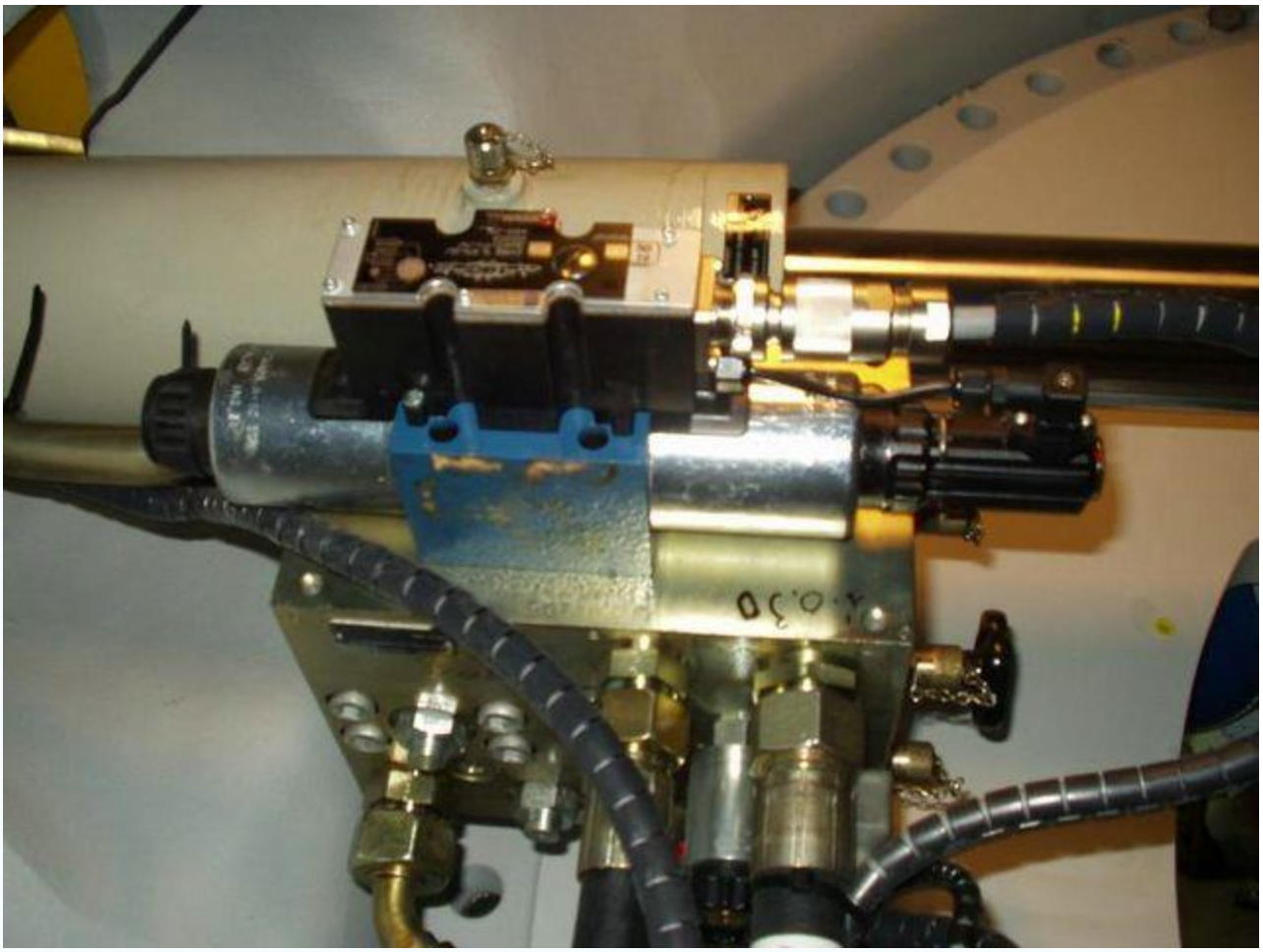
If it is red and there is pressure verified on test port MP, then the valve may also be defective.



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	0016-1690



Parker Proportional Valve

Relevant spare parts	
Description	**Item No.**
PROP. VALVE D31FHE01C	60112621

Relevant CIM case		
CIM case	**Task list**	**SWI**
2303 / 3382	14333	

Rexroth Proportional Valve

Relevant spare parts	
Description	**Item No.**
PROP VAL 4WREE 10R75-2X/G24K31	60078979

Relevant CIM case		
CIM case	**Task list**	**SWI**
1914	14334	

Part number for Proportional valve Cable

Relevant spare parts	
Description	**Item No.**
Cable W 956 Proportional valve Y0205.0-1	60021544

Perform the blade bearing rotation operation

Does this solve the problem?

1] Yes

2] No

3] I don't know

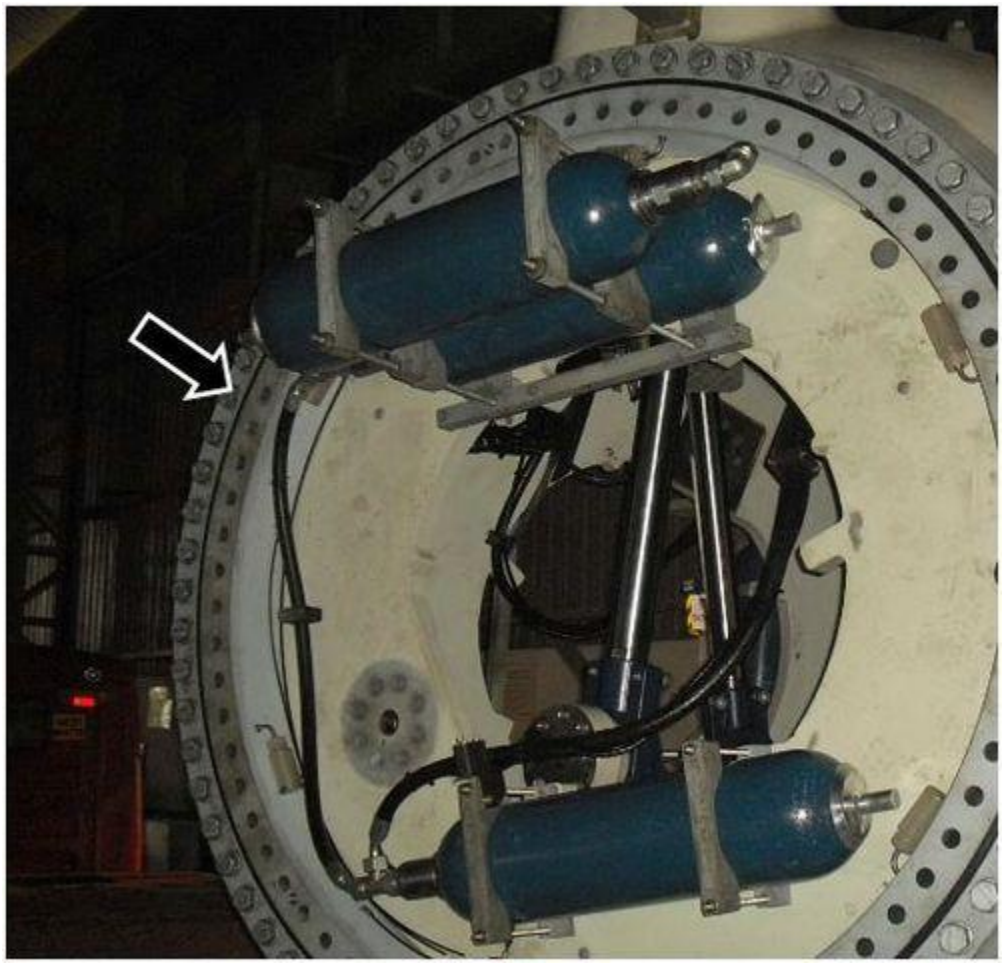
- **Explanation**
  IN THE HUB:

  Check the blade bearing operation ‘Pitching to run’ and ‘Pitching to stop’.

  Check for any vibration in the blades or anything abnormal about the system during operation.

Perform the Blade Pitch System Test

Relevant documentation	
Description	**DMS No.**
WI - Blade Pitch System Test	0002-0467



If manual greasing does not solve the problem, the likely cause is blade bearing failure (consult local Technical Support or Engineering group to confirm next steps).

CIM1908: Pitch bearing_IMO_NM_Bearing seal leakage

CIM 929: Pitch bearing_RE (IMO)_NM_Bearing sealing is leaking

Relevant CIM case		
CIM case	**Task list**	**SWI**
1908	16781,16782	
929	16781,16782	

Part number for Blade bearing:

Relevant spare parts	
Description	**Item No.**
BLADE BEAR. STD. IMO -NEW SEAL	60113392
BLADE BEARING STD LAULAGUN	01044456

Relevant documentation	
Description	**DMS No.**
Manual grease procedure for blade bearing V82	0024-9719