Check and replace the defective needle valve

Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**
  IN THE HUB:

Check the three blade pitch pressures through controller for any drop while the turbine is in operation.

If any of the blade pitch pressures drop –check the affected blade pitch hydraulic system.

If all three pitch pressures drop – check the main distribution block hydraulic system.

Ensure the Needle valves are closed properly (do not over tighten as this will cause the valve to leak).

Check the pitch system for any oil leaks.

Check that the pitch system electrical connections are not loose.

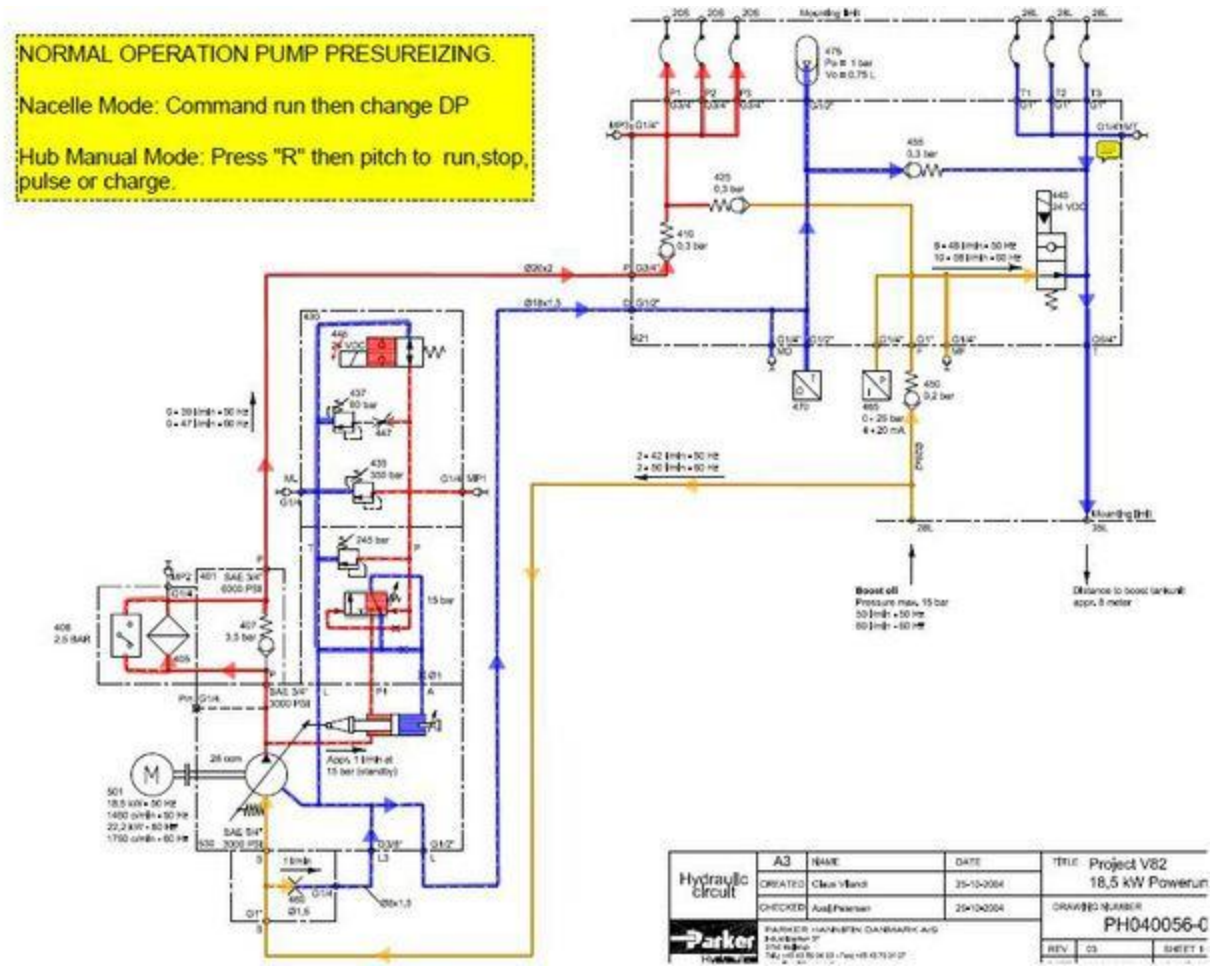
Swap the needle valve to quickly determine if it is leaking.

If defective, replace with new.

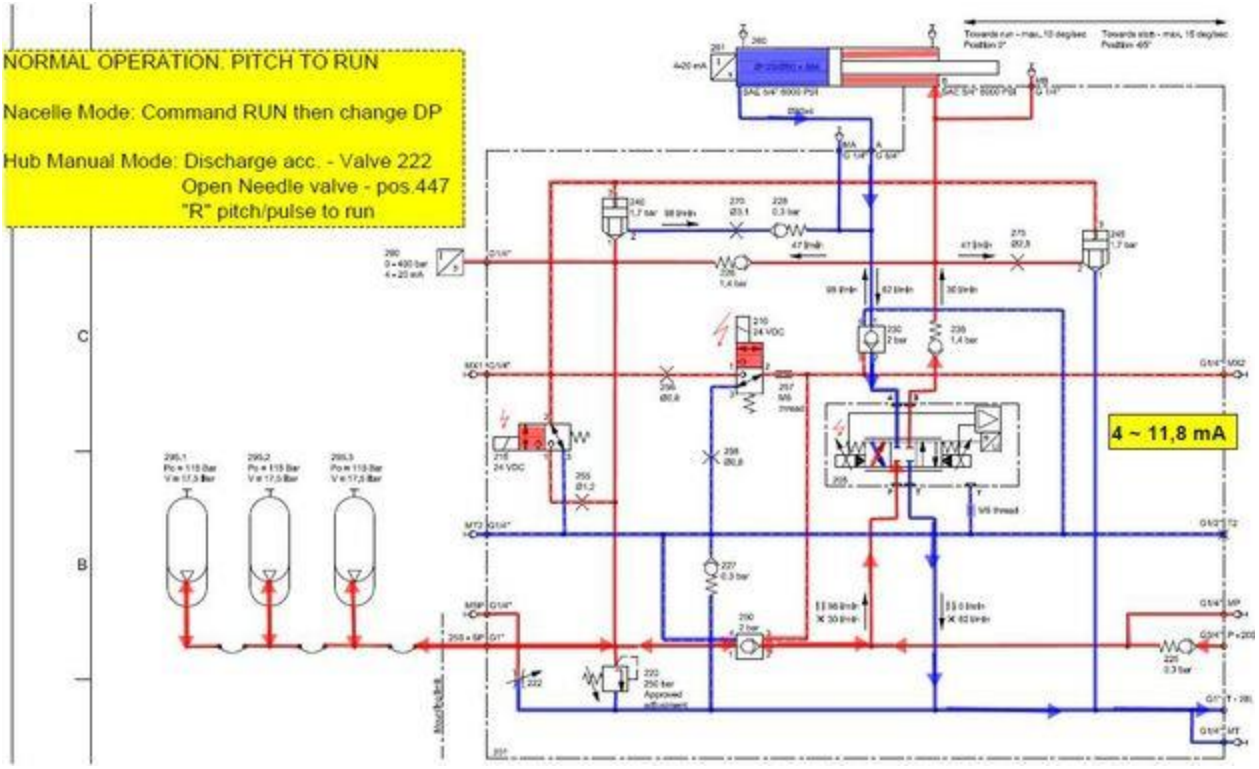
Circuit pressure line reference:

PARKER SYSTEM:

Main distribution block when pump pressurizing mode:

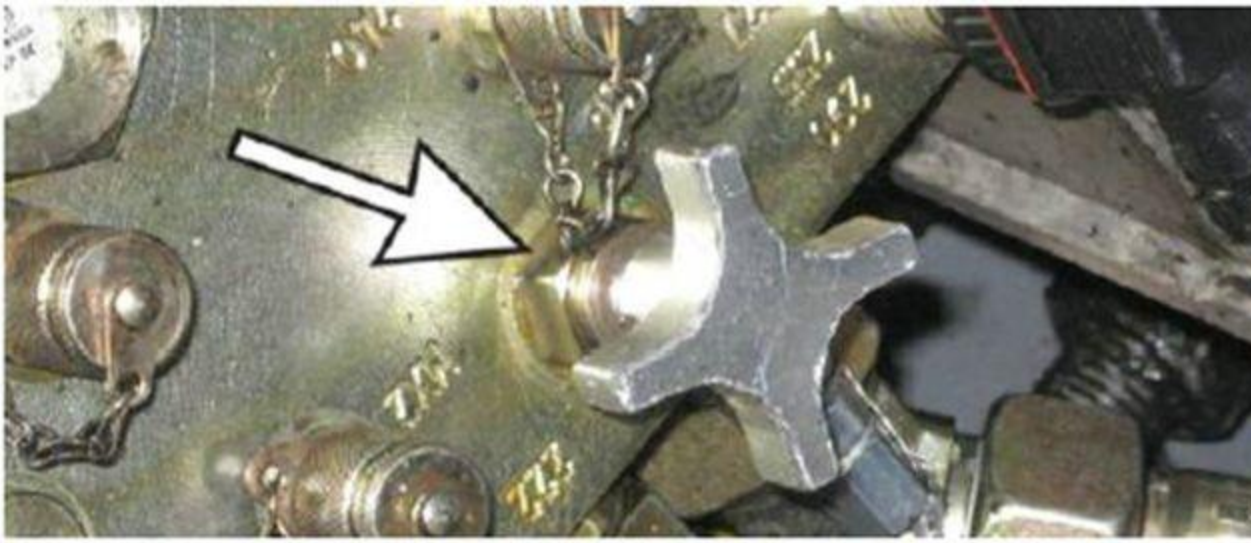


Pitch distribution block when turbine in ready for operation mode:



Needle valve part number for PARKER System: (POS: 447, 222)

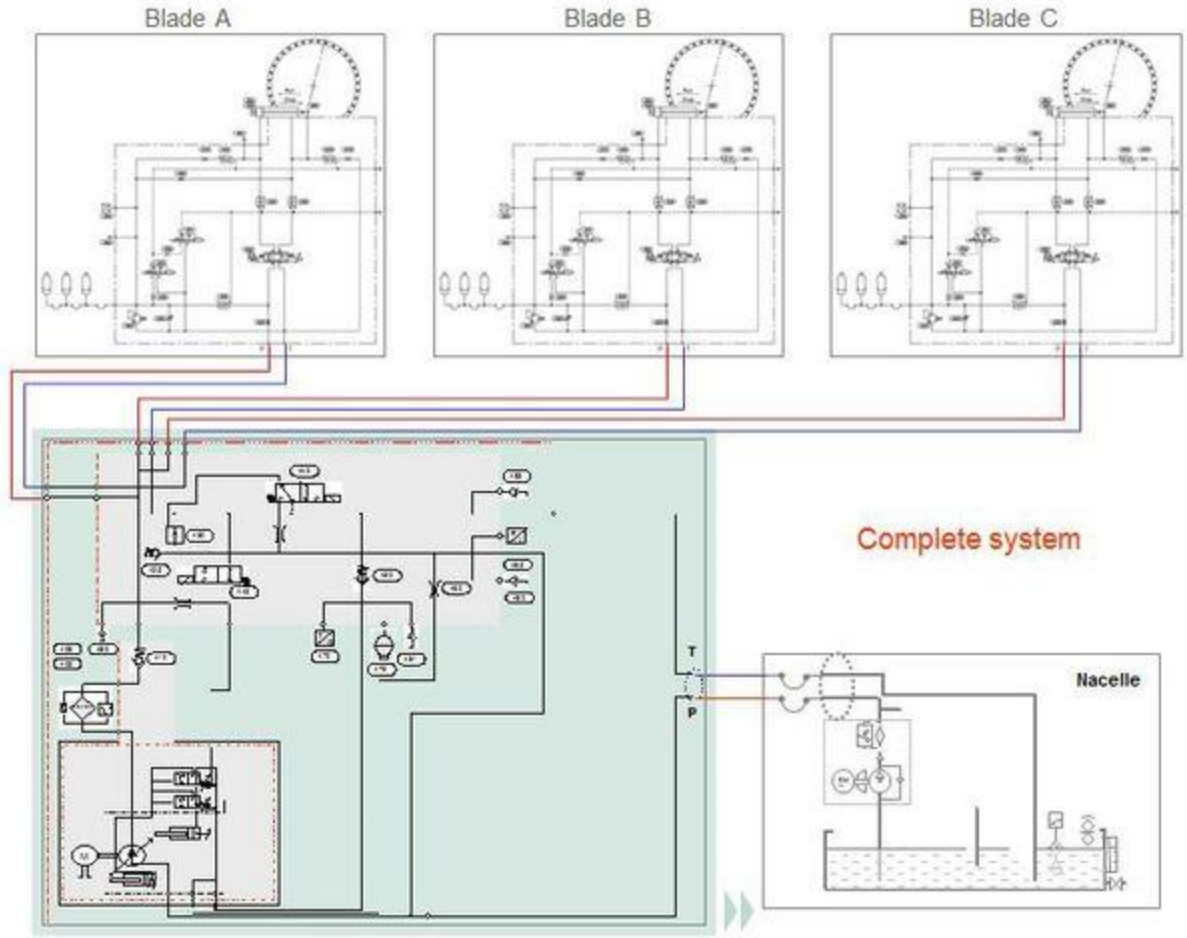
Relevant spare parts	
Description	**Item No.**
NEEDLE VALVE, NVH-2201	60104032
KNOB FOR NEEDLE VALVE	60112623



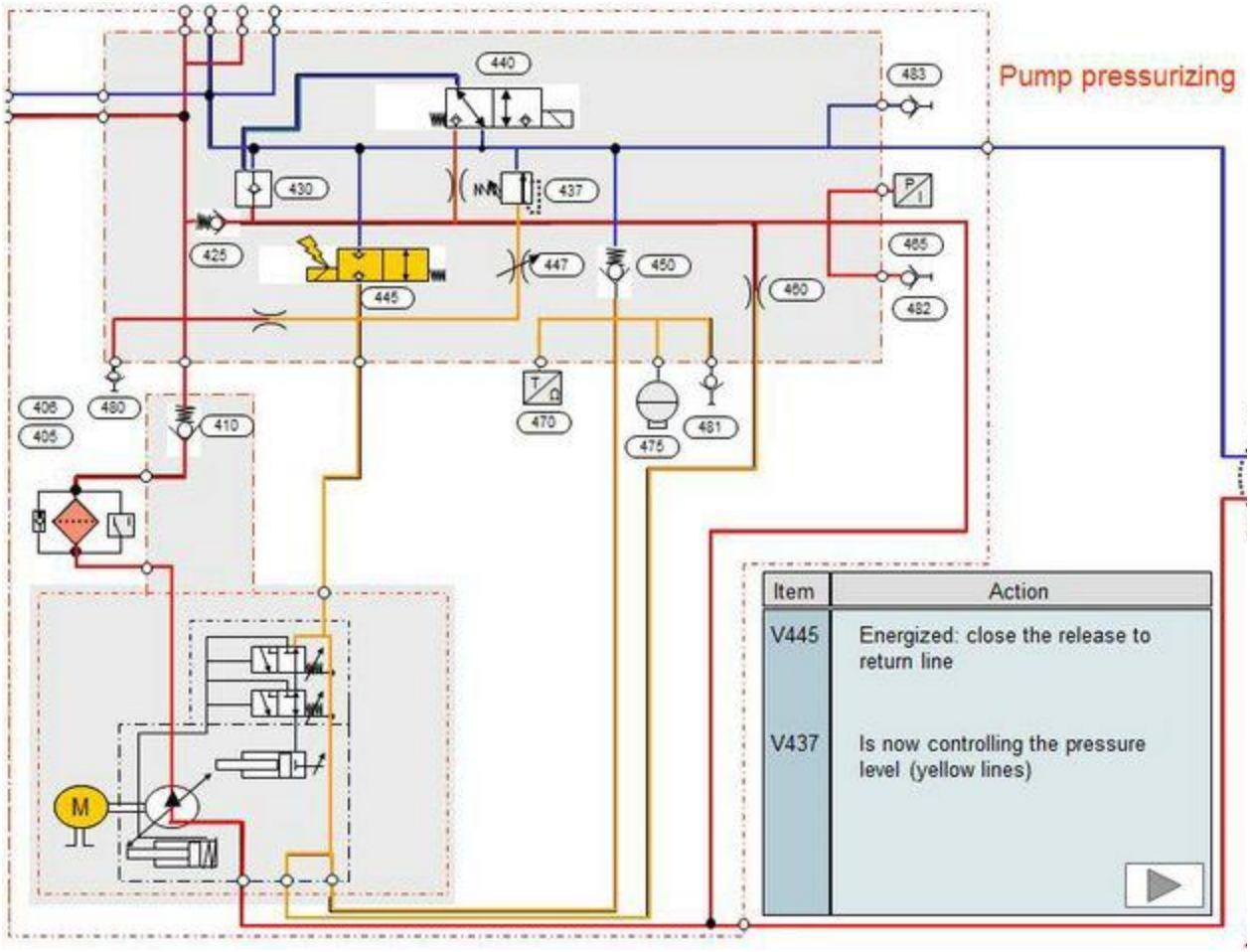
Relevant documentation	
Description	**DMS No.**
Hydraulic Pitch Control System Supplier Parker	0001-3199

REXROTH SYSTEM:

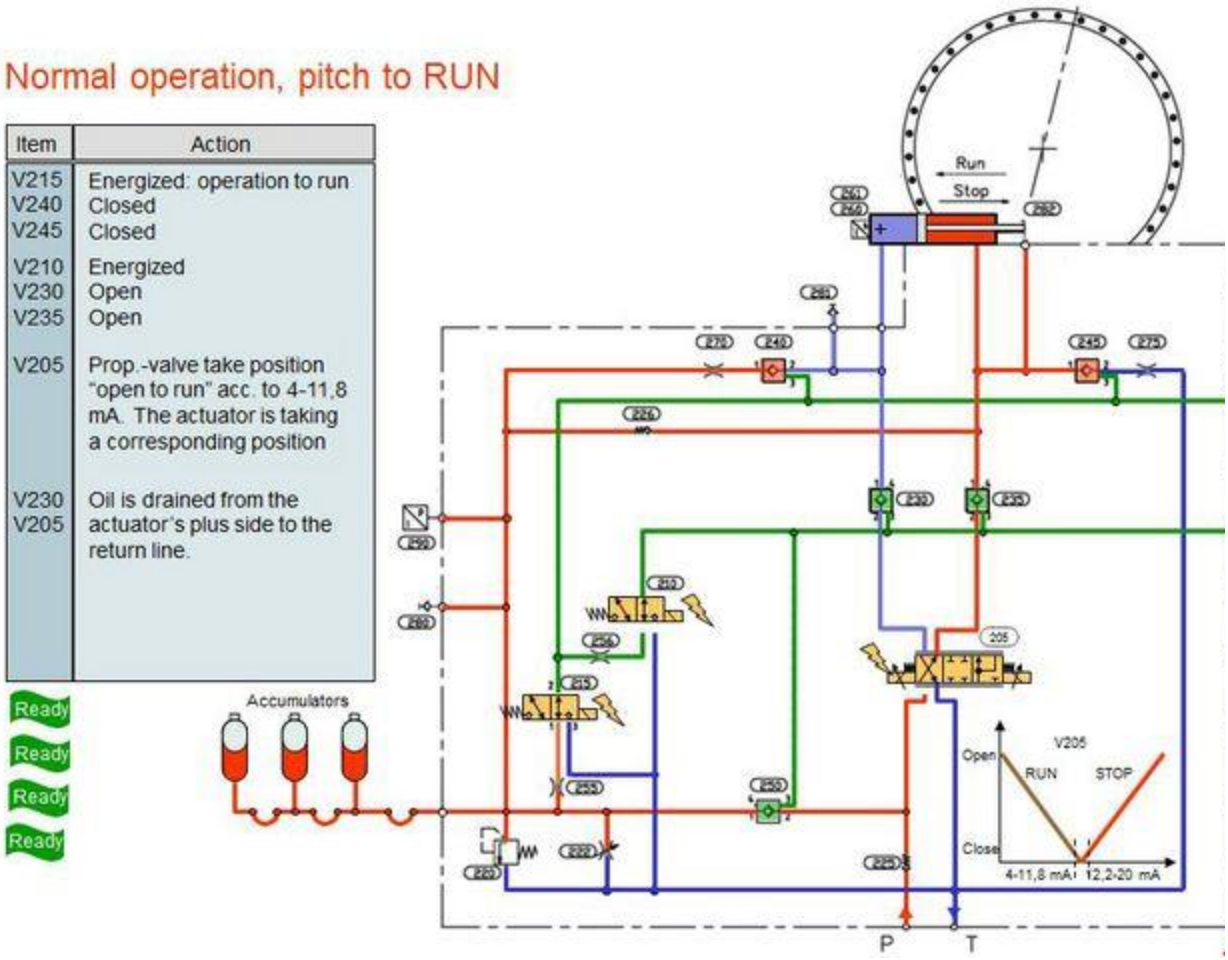
Overview hydraulic circuit:



Main distribution block when pump pressurizing mode:



Pitch distribution block when turbine in ready for operation mode:



Ensure the Rexroth hydraulic system needle valve type before replacing.

Needle valve part number for REXROTH System –TYPE-1: (POS: 447, 222)

Relevant spare parts	
Description	**Item No.**

THROTTLE VALVE: NFBC-KCN A3031	60096478
HANDLE FOR NFBC-KCN A30316JG01	60109005

Needle valve part number for REXROTH System –TYPE-2:

Relevant spare parts	
Description	**Item No.**
THROTTEL VAVLE NFCC-LCN A40122	105103
HANDLE FOR THROTTLE VALVE NFCC	60112482

Relevant documentation	
Description	**DMS No.**
Service Instruction – Fast Active Stall Hydraulics	1000778
Service instruction fast active stall system	0001-1672

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.

Relevant documentation	
Description	**DMS No.**
Commissioning instructionV82 -1.65-Mk4	0000-9925

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

Relevant documentation	
Description	**DMS No.**
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 all pitch accumulator pre-charge pressures.

Low pre charge pressure in the accumulators can also cause this alarm.

If any low pressure is measured in the accumulators recharge per SWI.

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

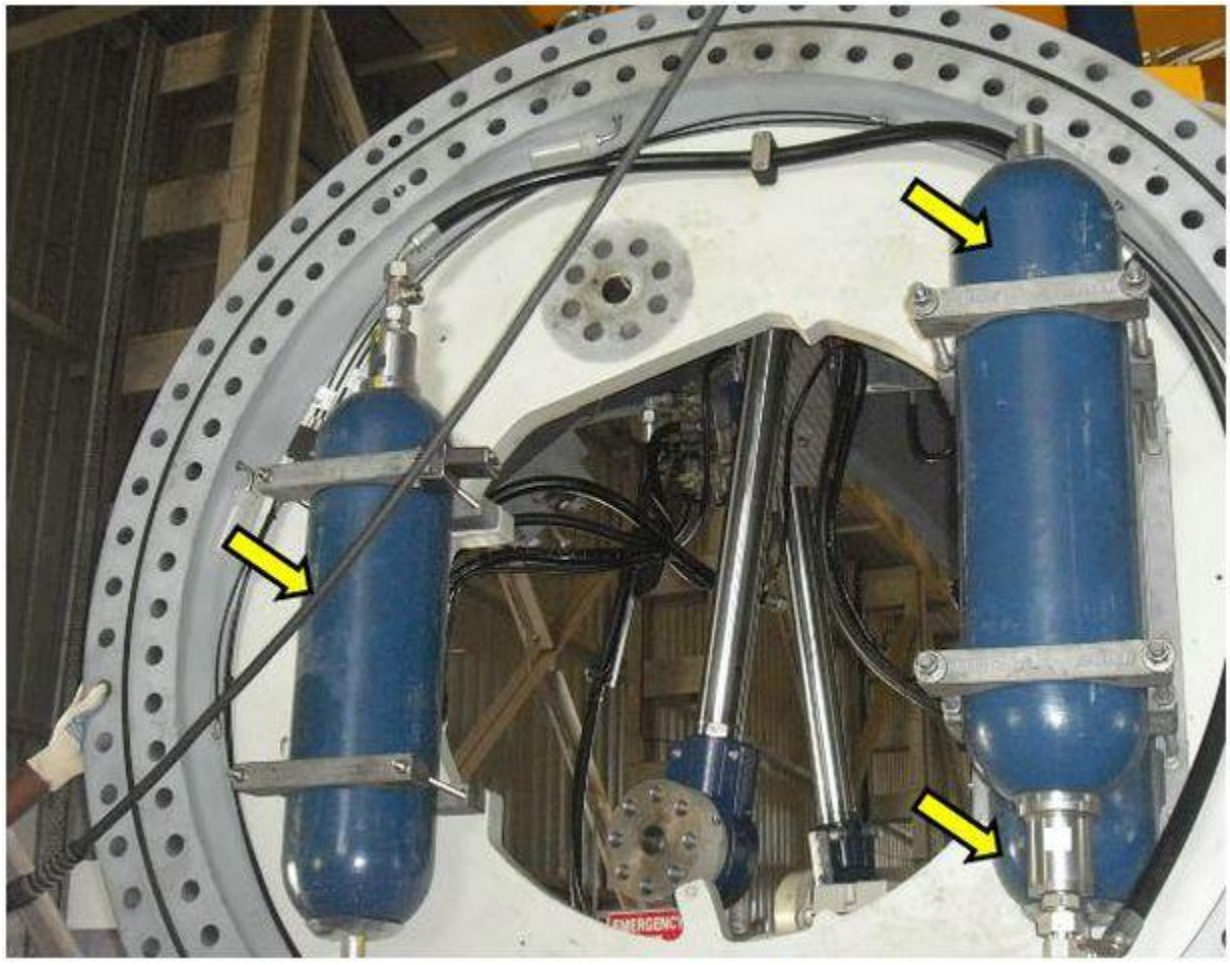
If any accumulators are failed, replace with new:

Relevant spare parts		
Platform	**Description**	**Item No.**
NM 72	HYDR ACCU 20 L 115 BAR DUAL	60113096
V82 other than Australia	HYDR ACCU 24.5 L 115 BAR DUAL	60113097
V82 Australia	HYDR ACCU 24.5 L 115 BAR AS1210	60113098

Relevant documentation	
Description	**DMS No.**
Blade Accumulator Exchange	0001-2871
Accumulator Retrofit Installation	0000-9402

Relevant CIM case		
CIM case	**Kit PN's**	**SWI**
1168	60113828 or 60113844(Arctic)	0000-9402

Check accumulator retrofit installation:



Replace the defective valves

Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**
  IN THE HUB:

Check the hydraulic circuit diagram.

Relevant documentation	
Description	**DMS No.**
Pitch Hydraulic circuit (Parker) Main manifold Diagram	5003018
Pitch Hydraulic circuit (Parker) Pitch manifold Diagram	5003013

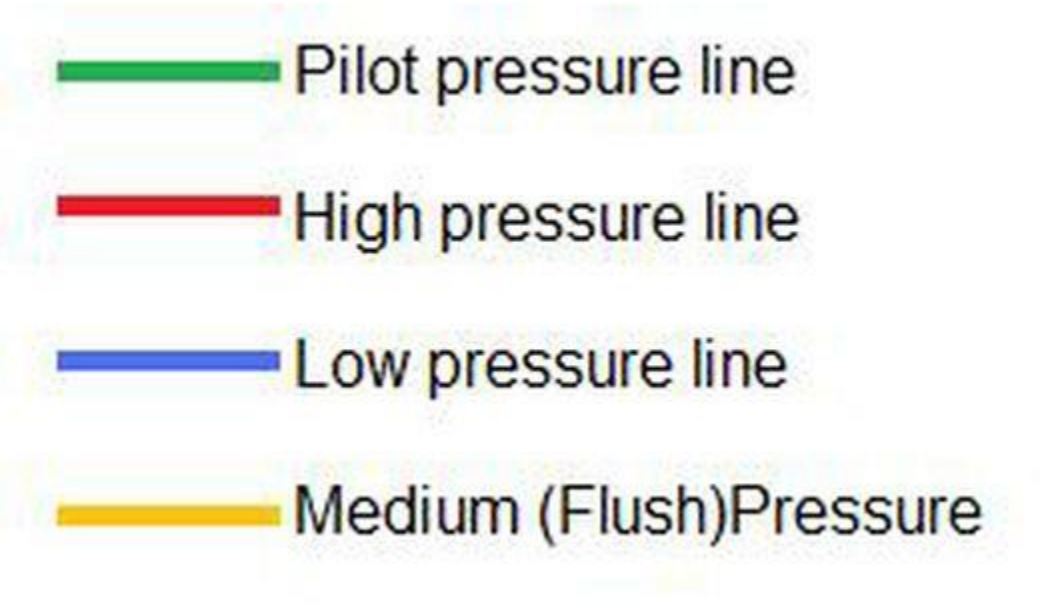
Relevant documentation	
Description	**DMS No.**
Pitch Hydraulic circuit (Rexroth) Main manifold Diagram	5003347
Pitch Hydraulic circuit (Rexroth) Pitch manifold Diagram	5003025
Pitch Hydraulic circuit (Rexroth) Filter manifold Diagram	5002046

Check the three blade pitch pressures through the controller for any drop while the turbine is in the operation.

If any of blade pitch pressures drop –check the affected blade pitch hydraulic system.

If all three pitch pressures drop – check the main distribution block hydraulic system.

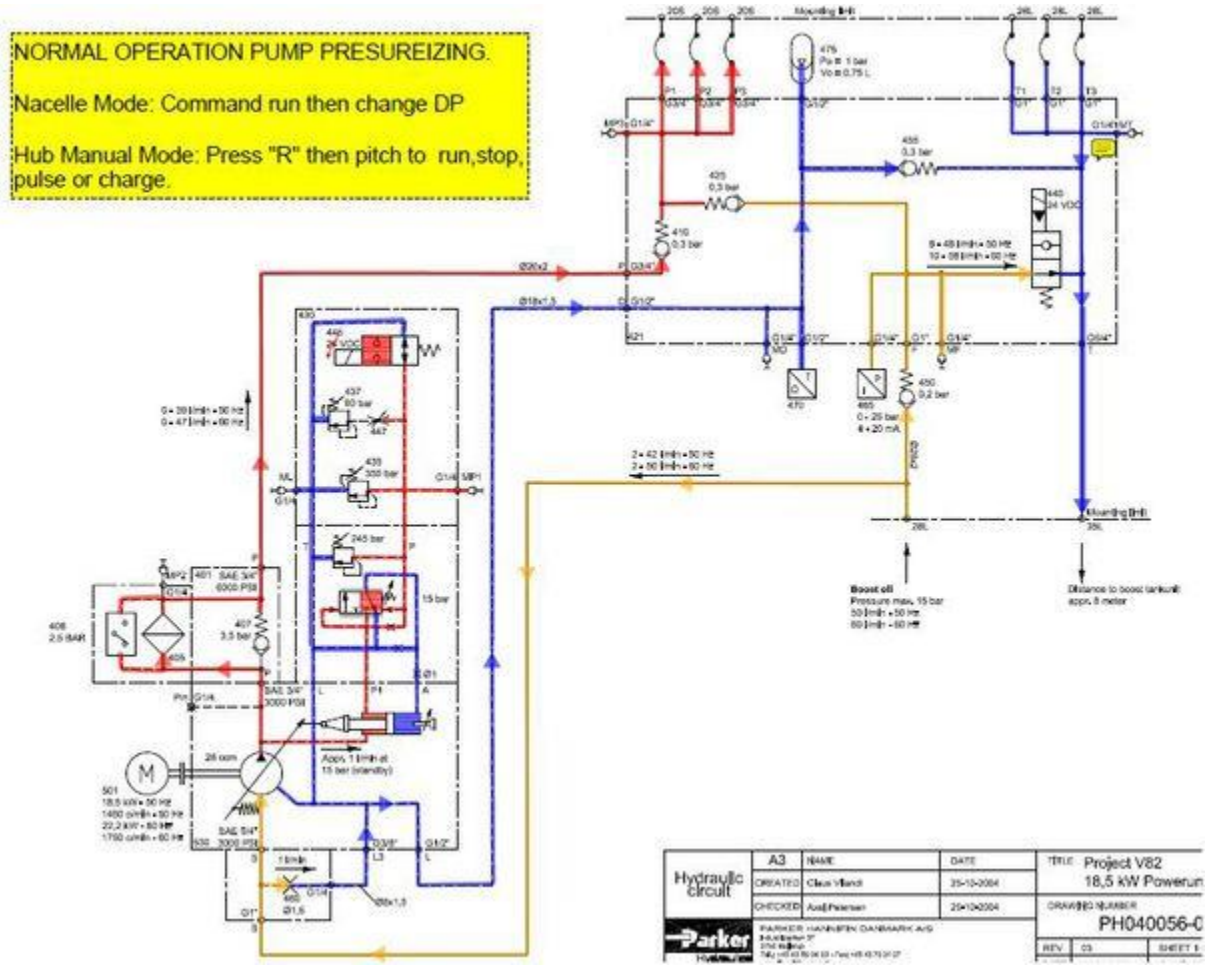
Circuit pressure line reference:



PARKER SYSTEM -MAIN MANIFOLD:

Relevant documentation	
Description	**DMS No.**
Hydraulic Pitch Control System Supplier Parker	0001-3199

Main distribution block when pump pressurizing mode:

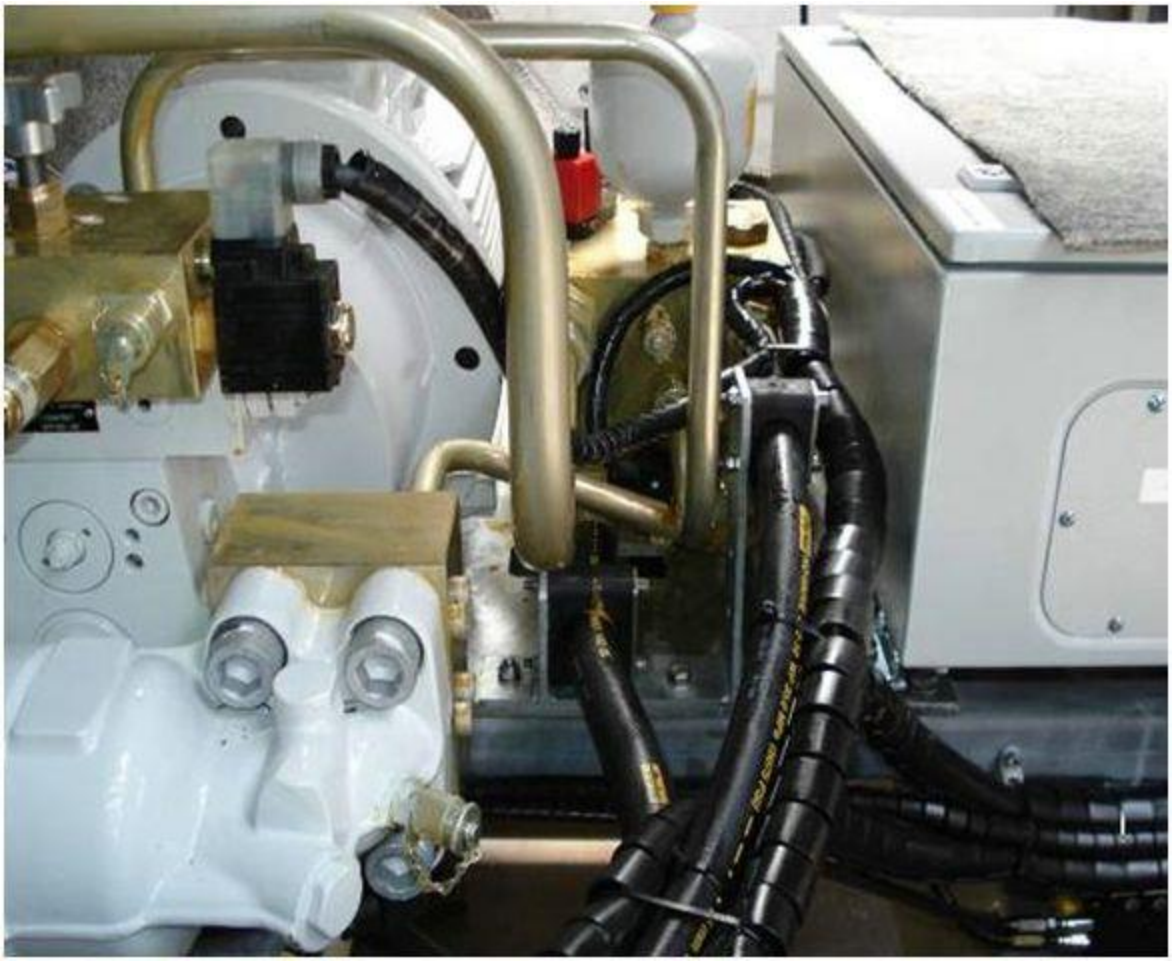


Check the following position valves:

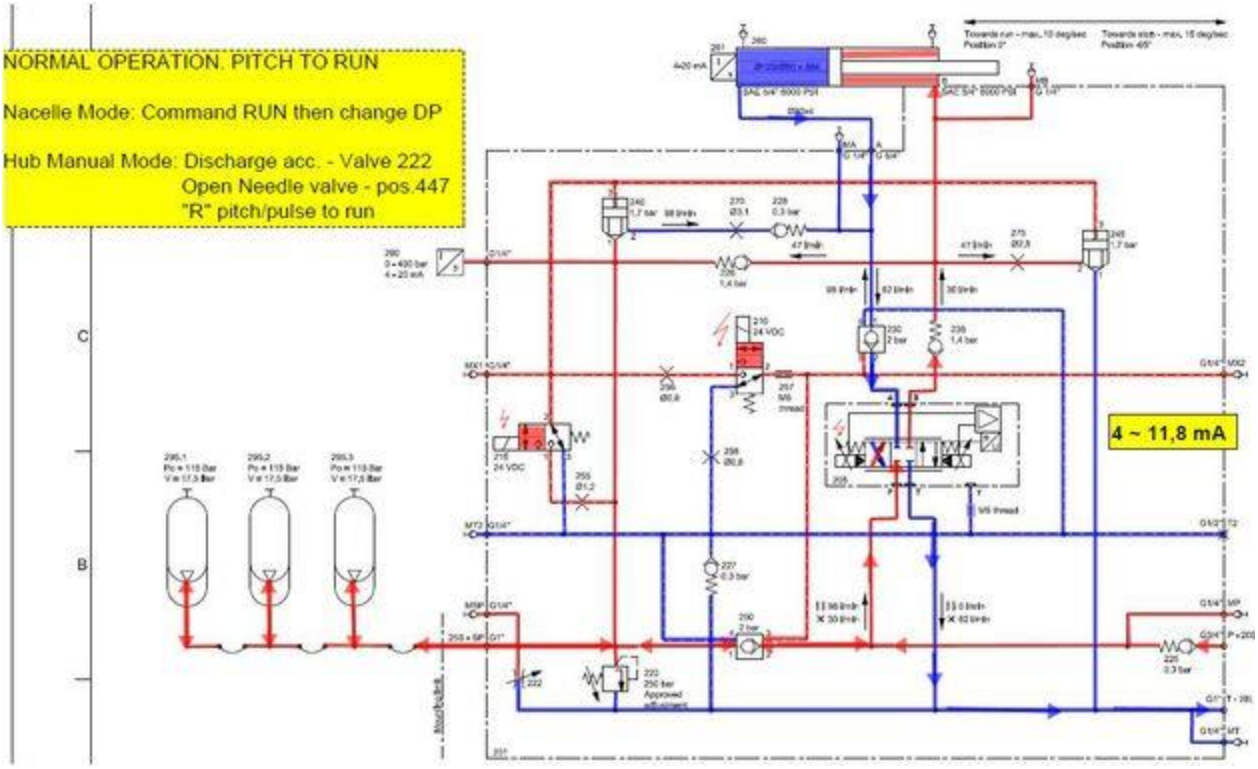
Check the valve operation. If any of the valves are defective, replace with new.

Part number for valves:

Relevant spare parts		
Description	**Item No.**	**Position**
CHECK VALVE, 0,3 BAR, 375L	60111616	410
CHECK VALVE, 0,3 BAR, 82L	60111613	425, 455
SOL. VALVE NO, DS201 NR	60112645	440
COIL, 30 WATT 24 VDC DIN PLUG	60112646	
RELIEF VALVE, RDH-08-2-S-50, 138 - 345 BAR	60112643	435
RELIEF VALVE, RDH-08-2-S-30, 69 - 207 BAR	60104030	437
SOL. VALVE NO, DSH081 NL	60112647	445
COIL 24VDC DIN PLUG S8LDD024	60104025	445A
NEEDLE VALVE, NVH-2201	60104032	447
KNOB FOR NEEDLE VALVE	60112623	447A



Pitch distribution block when turbine in ready for operation mode:



Check the following position valves:

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

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

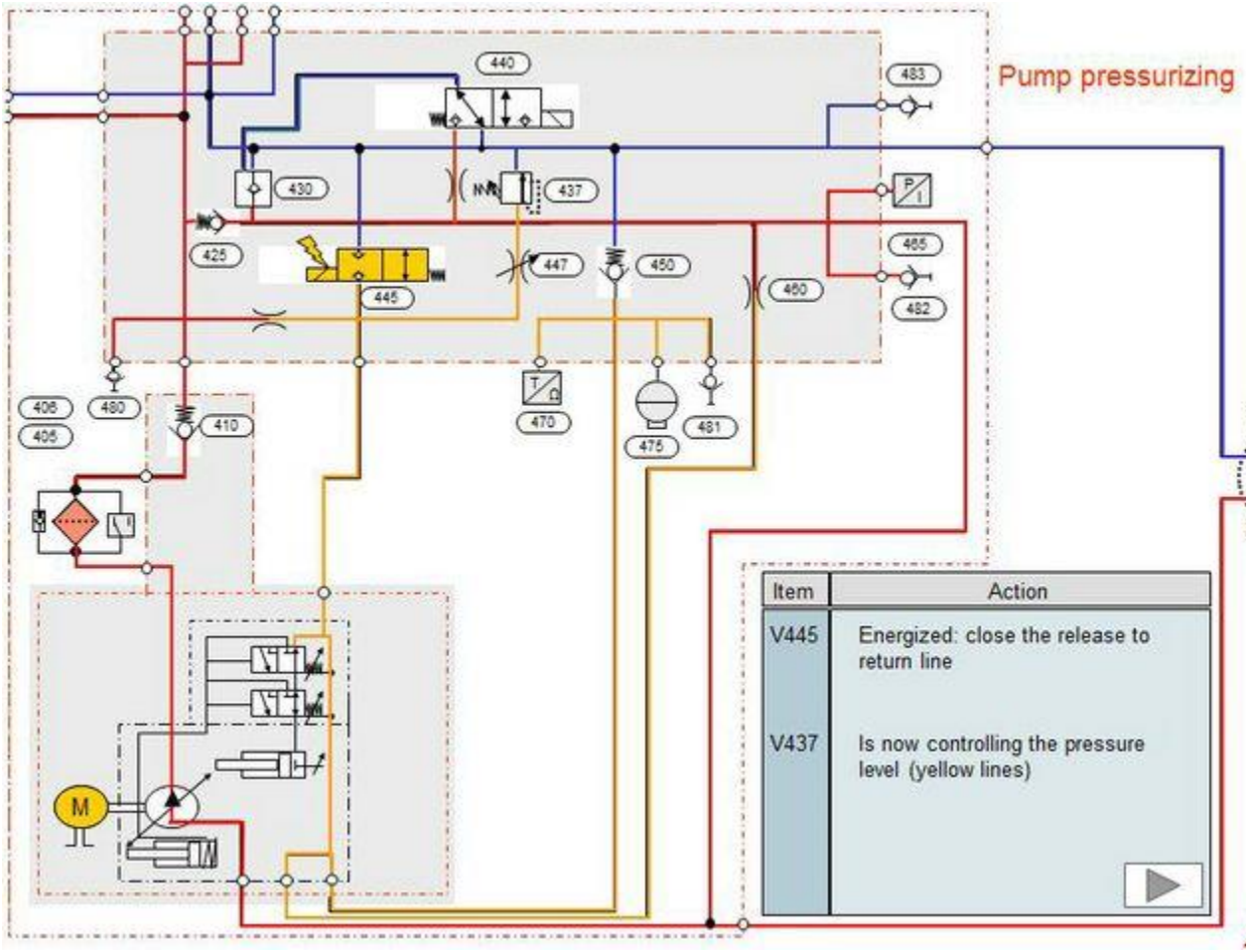
Part number for valves:

Relevant spare parts		
Description	**Item No.**	**Position**
CHECK VALVE PILOT:CVEV-XCN A30	60096481	230,250
NEEDLE VALVE, NVH-2201	60104032	222

KNOB FOR NEEDLE VALVE	60112623	222A
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

REXROTH SYSTEM -MAIN MANIFOLD:

Main distribution block when pump pressurizing mode:



Check the following position valves:

Check the valve operation. If valves are defective replace with new.

Part number for valves:

Relevant spare parts		
Description	**Item No.**	**Position**
ACCUM HYDR 0BAR 0.7L 1/2" BS	103805	475
CHECK VALVE: M-SR 15 KE02-1X/	60096479	410,425
PRESSURE CONTROL VALVE: KBD2HO	60096503	437
VLV SOLENOI KSDER1PA/HG24N9K4M	60098803 (phased out)	445
CHECK VALVE COFA-XBN	60099554	430

The part No. 60098803 is phased out. It is replaced by 780430.

Relevant spare parts		
Description	**Item No.**	**Status**
VLV SOLENOI KSDER1PA/HG24N9K4M	60098803	Phased out
KSDER1PB/HN9V F BRAKE UNIT 3MW	780430	Available

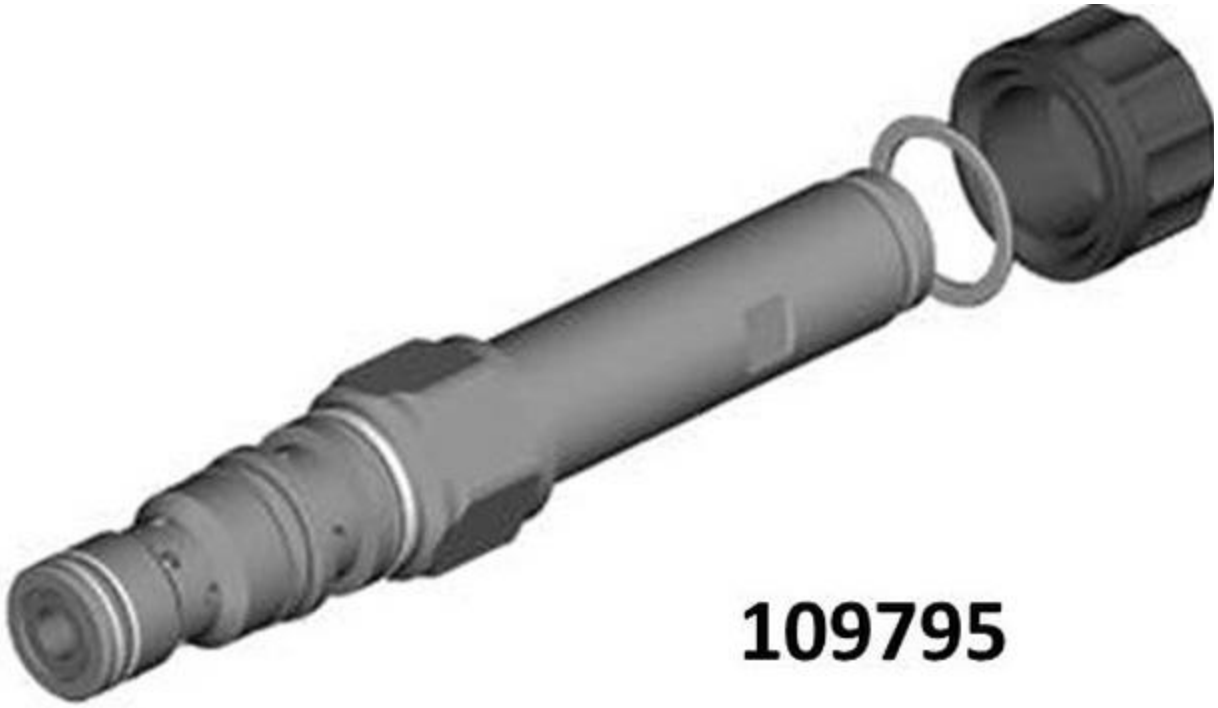
Part Number for Solenoid Valve

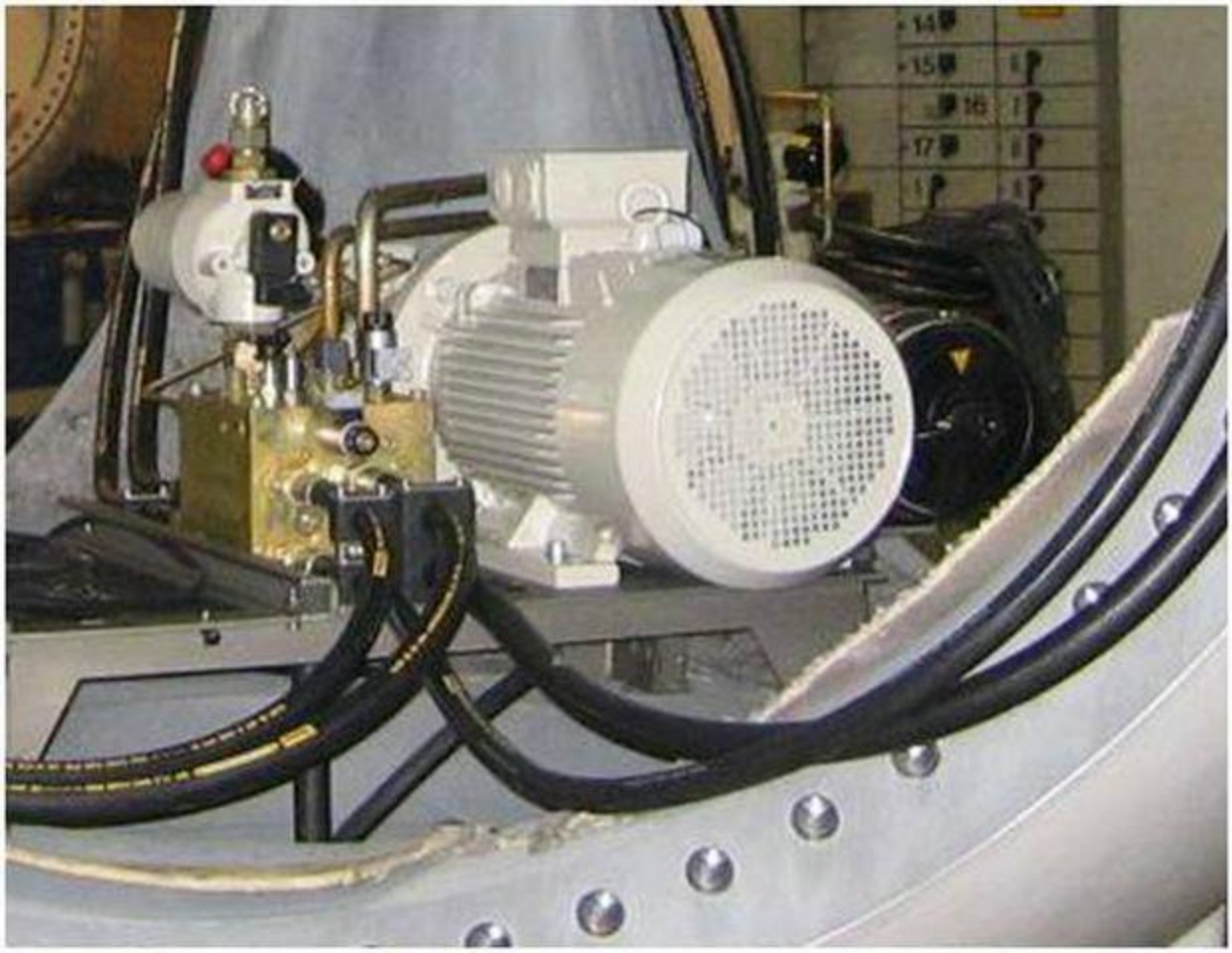
The part No.60096475 is phased out and henceforth replaced by 109795 & 60106201.

(Rexroth) Valve/Solenoid- 440

Relevant spare parts

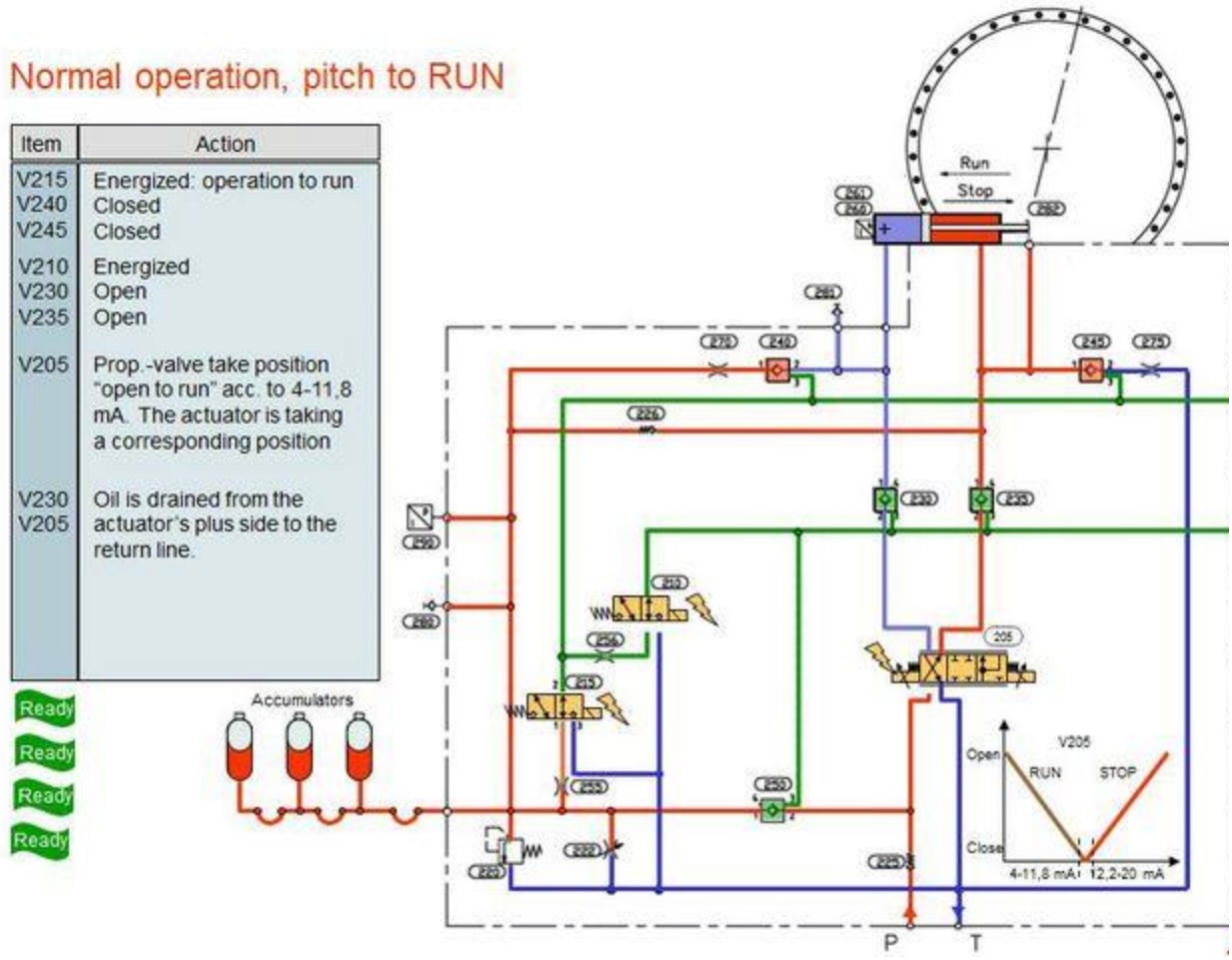
Description	Item No.	Status
SOL VAL KSDEU1CA/HCG24N0K4M	60096475	Phased out
ELECTRIC SEAT VALVE	109795	Available
COIL GZ37-4 24VDC 19W	60106201	Available


109795



REXROTH SYSTEM -PITCH MANIFOLD:

Pitch distribution block when turbine in ready for operation mode:



Check the following position valves:

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

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

Part number for valves:

Relevant spare parts		
Description	**Item No.**	**Position**
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 A3	60096481	230,235,250
VALVE CHECK PILOT COFA-XAN A30	60096493	240,245

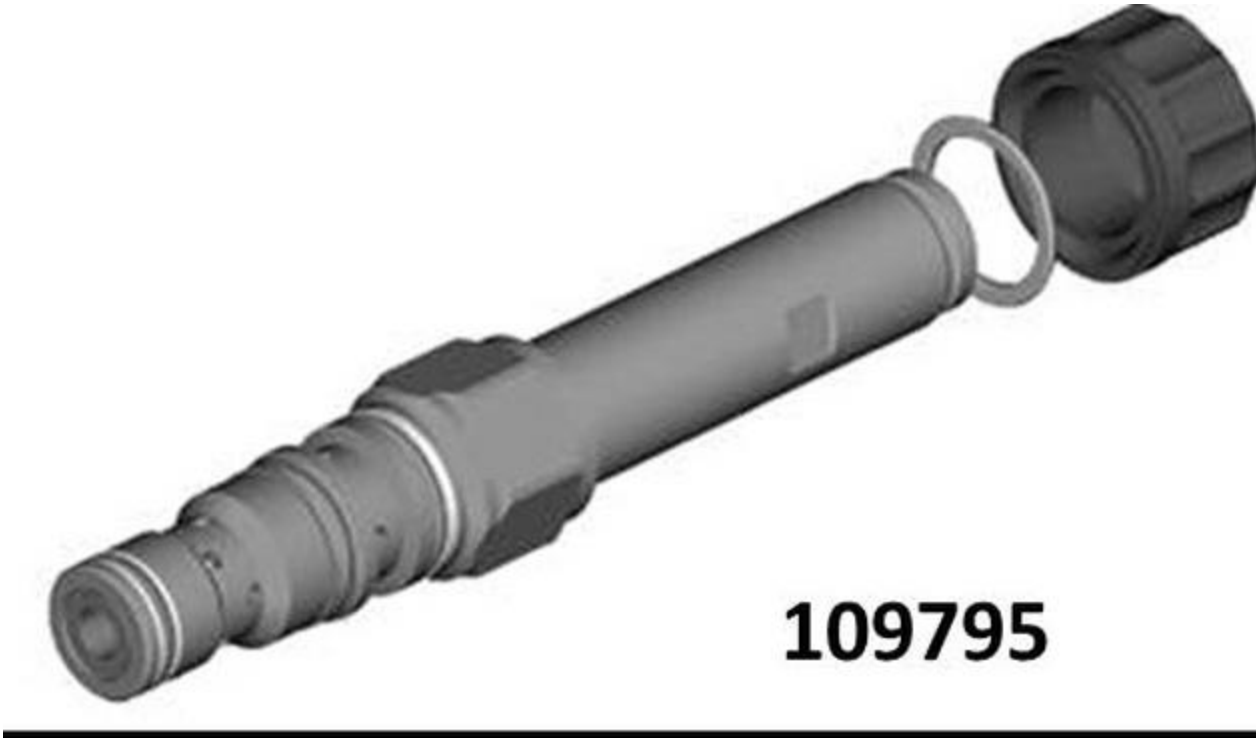
Part Number for Solenoid Valve

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

(Rexroth) Valve/Solenoid- 210 & 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


60106201



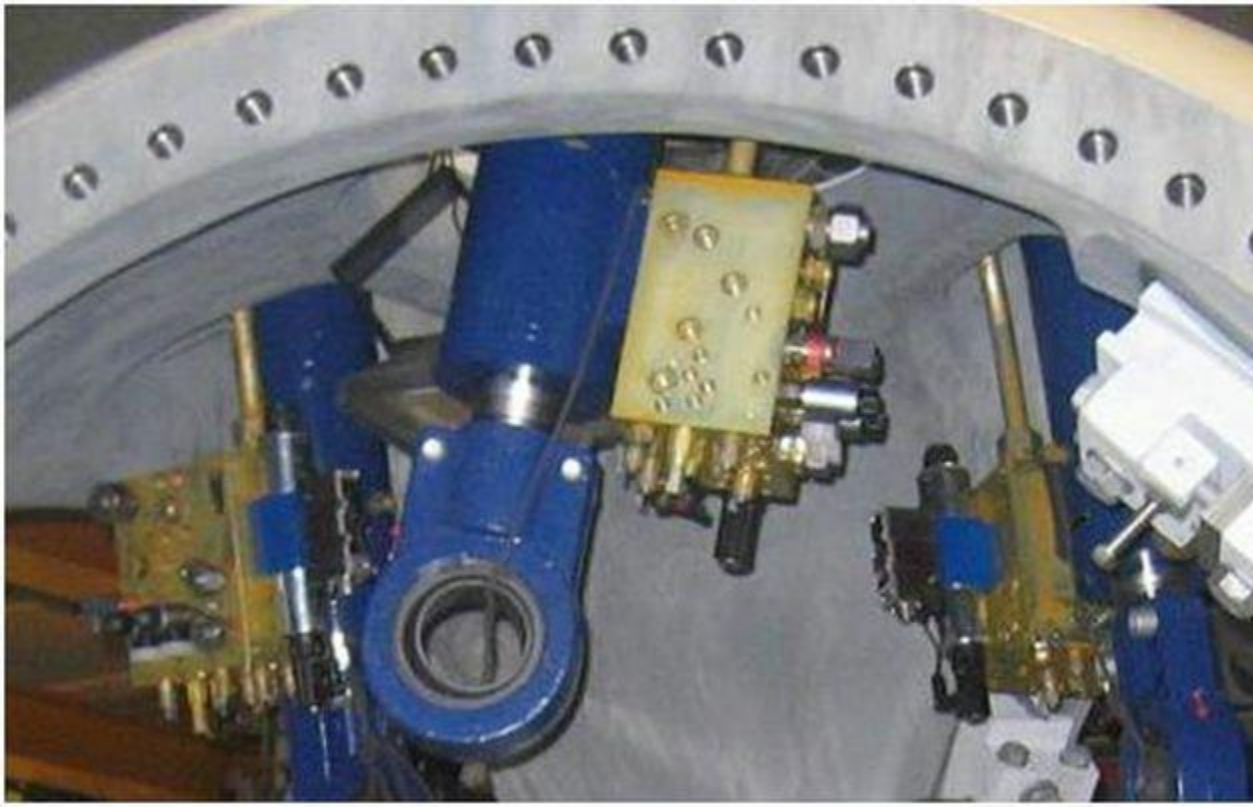
REXROTH NEEDLE VALVE TYPE-1 (POS: 447, 222)

Relevant spare parts		
Description	**Item No.**	**Position**
THROTTLE VALVE: NFBC-KCN A3031	60096478	447,222
HANDLE FOR NFBC-KCN A30316JG01	60109005	

REXROTH NEEDLE VALVE TYPE-2 (POS: 447, 222)

Relevant spare parts

Description	Item No.	Position
THROTTEL VAVLE NFCC-LCN A40122	105103	447,222
HANDLE FOR THROTTLE VALVE NFCC	60112482	



Refer to the service work instructions for more details.

Relevant documentation

Description	DMS No.
Change of Valve in Parker Pitch Manifold	0002-4365
Distribution Manifold Replacement	0021-3758
Fast Active Stall Hydraulics Valve replacement SWI	1000778
Fast Active Stall System SWI	0001-1672

Check the compensator valve setting and replace the defective valve

Does this solve the problem?

1] Yes

2] No

3] I don't know

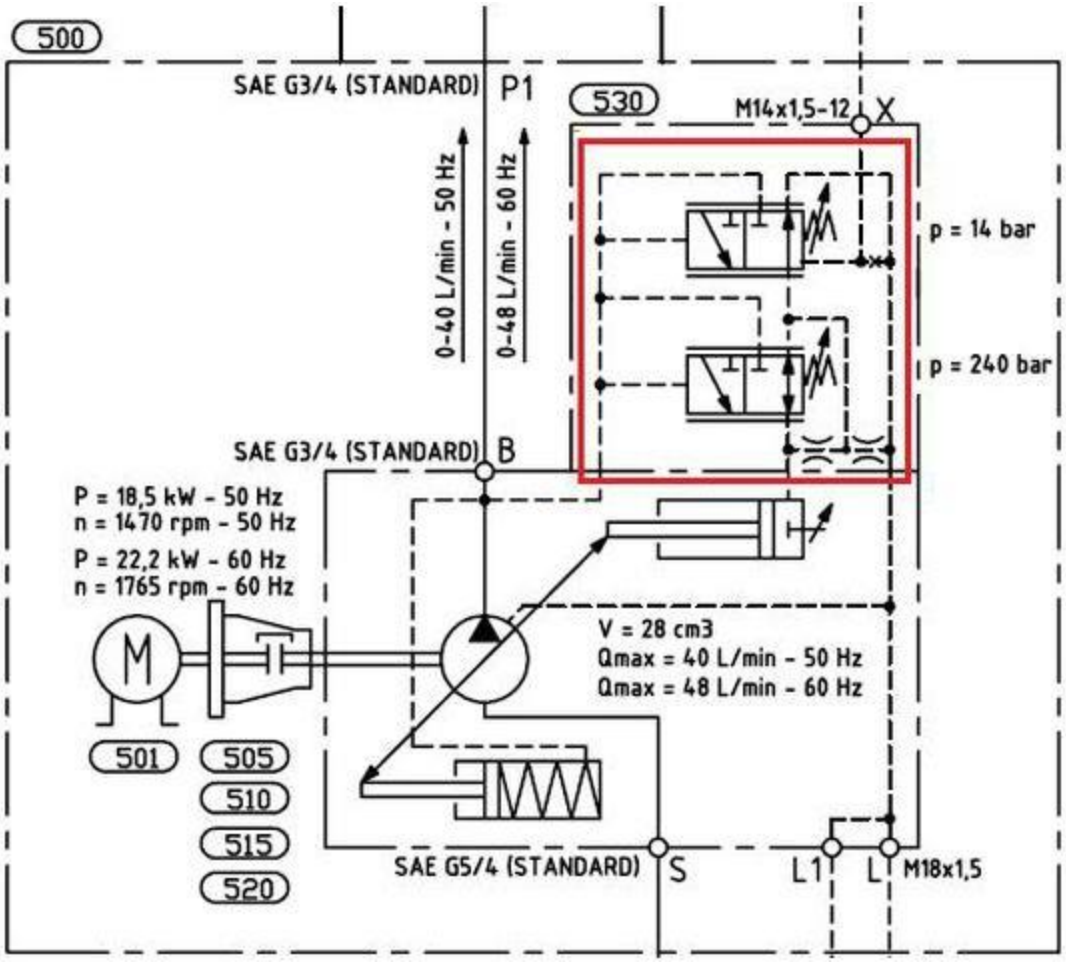
- **Explanation**

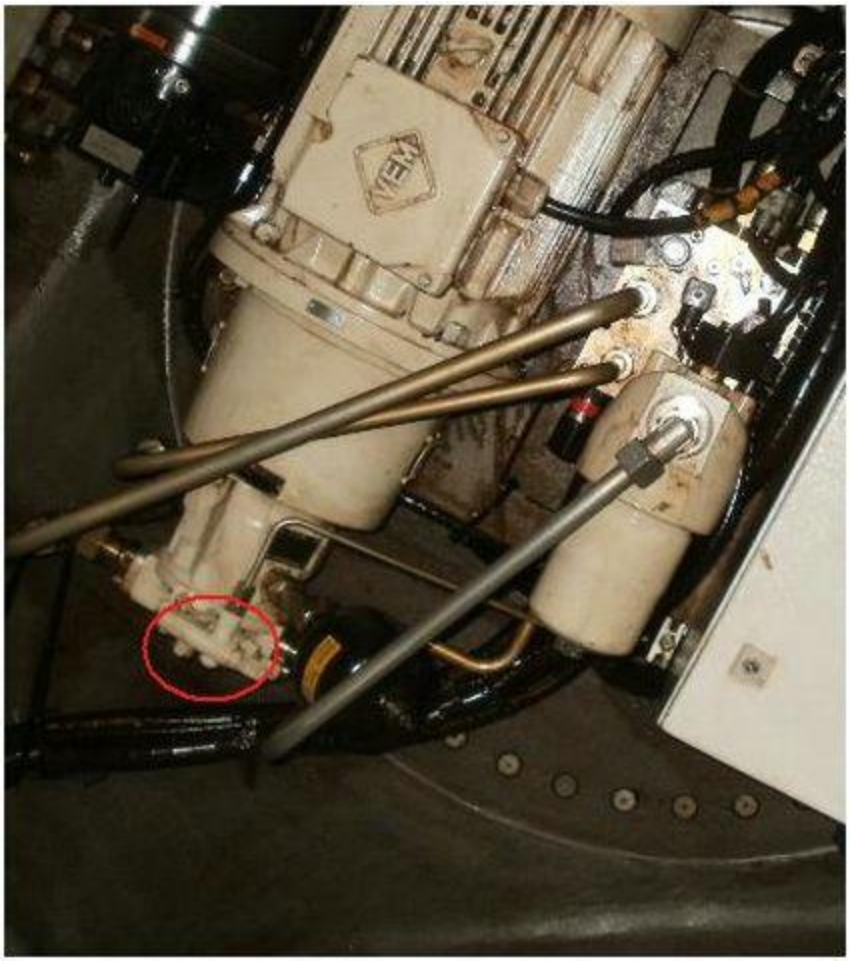
IN THE HUB:

Check the compensator valve (relief valve) setting in the hydraulic pitch pump.

Relevant documentation	
Description	**DMS No.**
SWI Pitch Pump Pressure Settings	0006-8149

REXROTH SYSTEM:

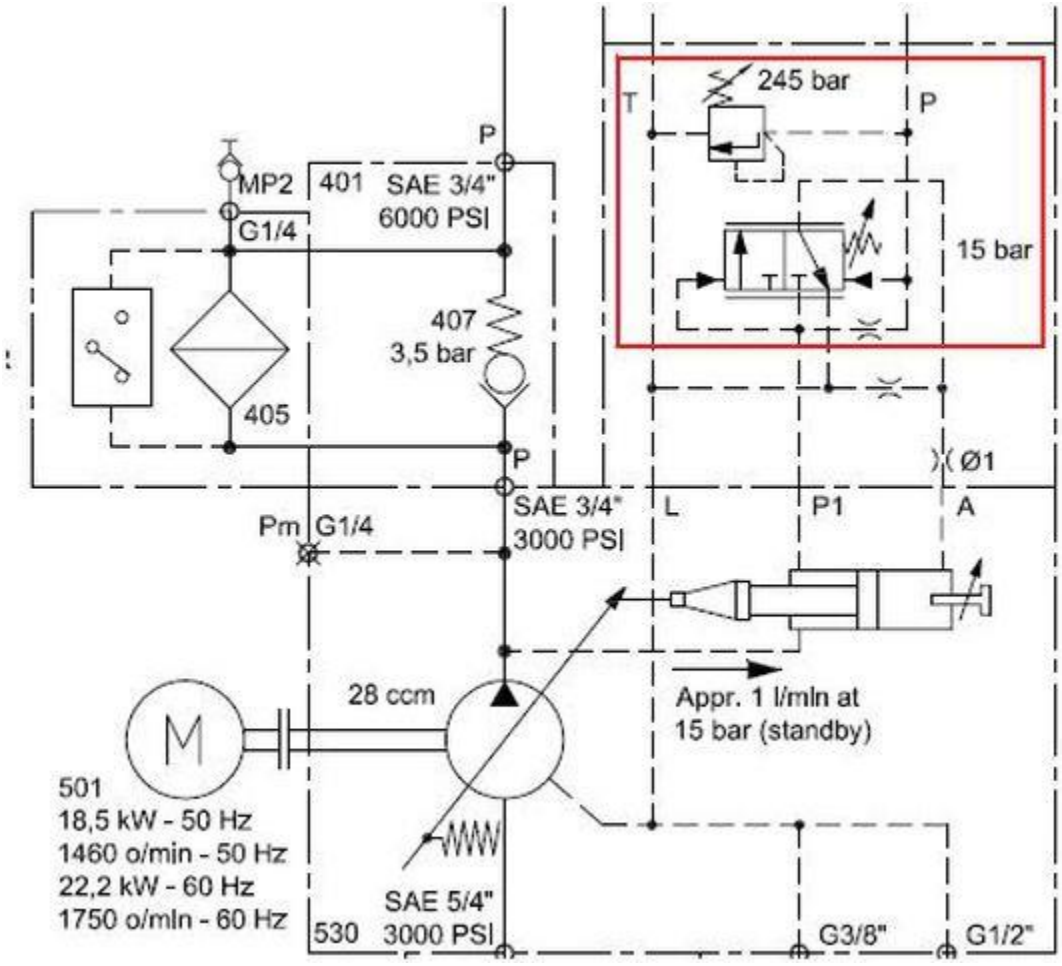

500
SAE G3/4 (STANDARD)
P1
530
M14x1,5-12
X
0-40 L/min - 50 Hz
0-48 L/min - 60 Hz
p = 14 bar
p = 240 bar
SAE G3/4 (STANDARD)
B
P = 18,5 kW - 50 Hz
n = 1470 rpm - 50 Hz
P = 22,2 kW - 60 Hz
n = 1765 rpm - 60 Hz
M
V = 28 cm3
Qmax = 40 L/min - 50 Hz
Qmax = 48 L/min - 60 Hz
501
505
510
515
520
SAE G5/4 (STANDARD)
S
L1
L
M18x1,5

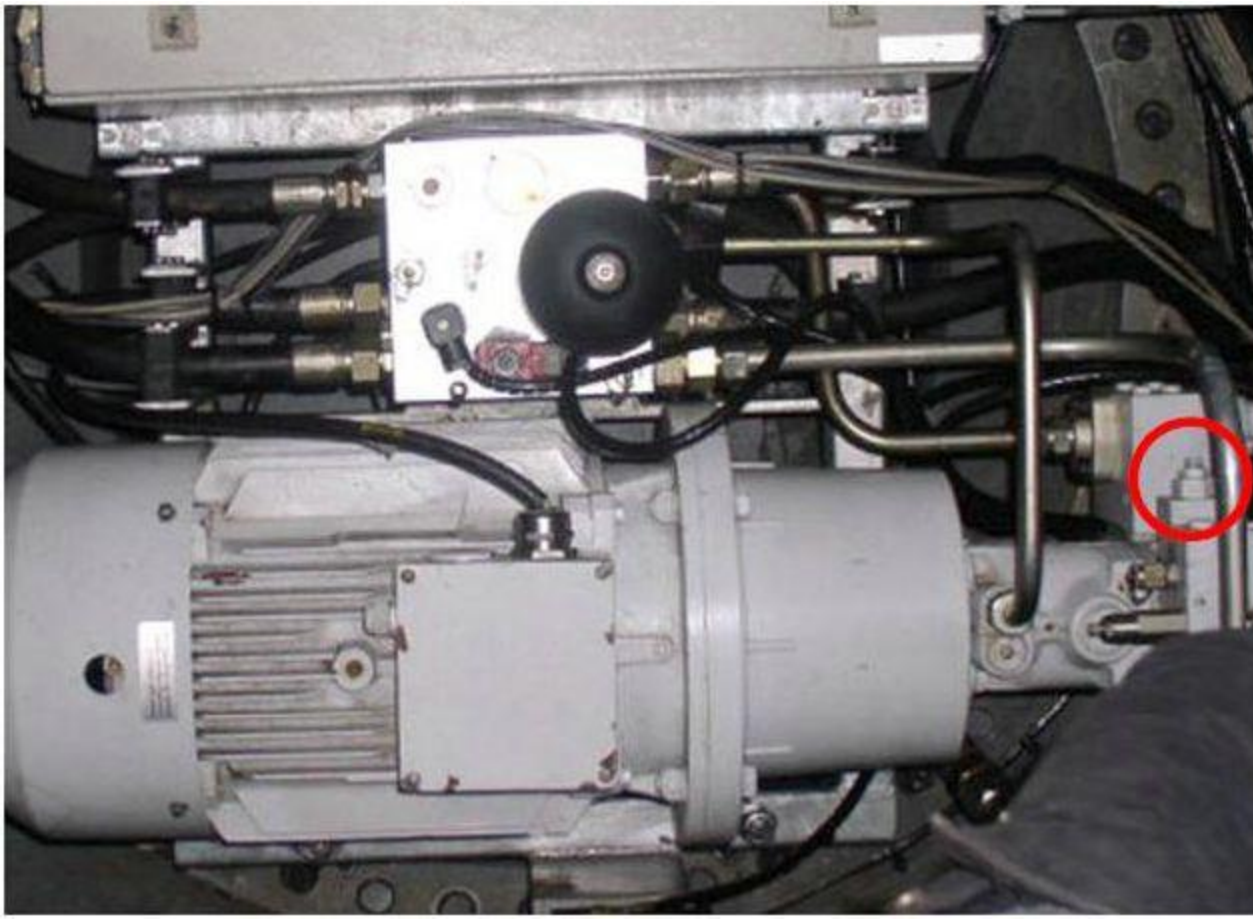


Part number for Rexroth compensator valve:

Relevant spare parts	
Description	**Item No.**
VALVE DFR1 RAL7032 240/14 BAR	60113742

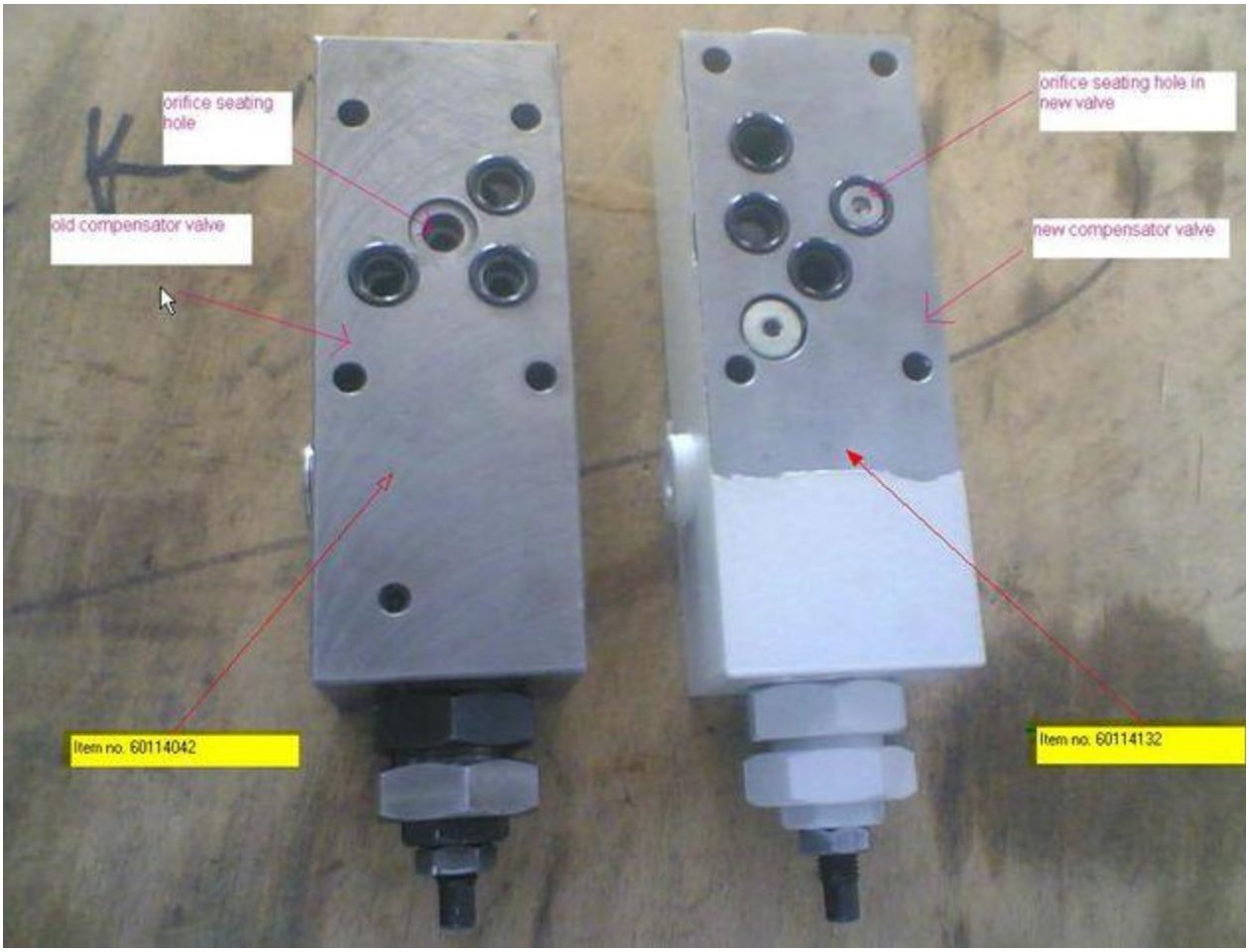
PARKER SYSTEM:





Parker hydraulic systems have two different types of compensator valves.

Ensure the valve type before replacing with a new valve.



Part number for Parker compensator valve:

Relevant spare parts	
Description	**Item No.**
Old type: HYDR PUMP PRESSURE CONT. VALVE	60114042
New type: HYDR PRES. COMP. VALVE 245/15	60114132

Perform a visual inspection of the back of the pitch cylinder bore.

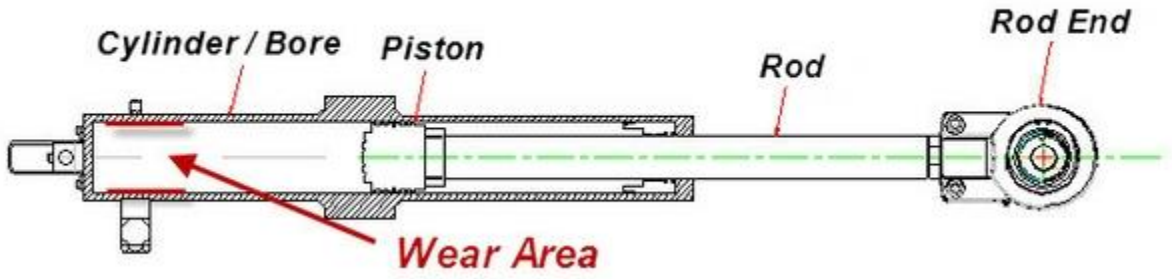
Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**



The back 250 mm of the pitch cylinder bore may be susceptible to excessive wear. This area of the cylinder is where the piston operates during production. When excessive wear occurs in the cylinder barrel, the piston seals are also subjected to accelerated wear, and internal leakage will occur in both run and stop positions. The effect of this leakage is excessive pump run time during operation as well as during stop. In the event of a pump failure, grid outage or certain turbine faults, pressure within the accumulators will bleed off, and blades may be at risk of being pushed into the run position under high wind conditions. Check the back of the bore for abnormal wear.

Actions:

Refer to DMS doc 0059-1574 for inspection instructions and criteria for running the turbine if wear is found.

Relevant documentation	
Description	**DMS No.**
V-82 Pitch Ram Bore inspections	0059-1574
V82 Rexroth pitch ram installation on a Parker pitch system	0059-7339

Relevant CIM case		
CIM case	**Task list**	**Service Message**
3699	23210	0059-3323 Evo2 Pitch Cylinder Wear

Replace the defective actuator or replace the defective seal

Does this solve the problem?

1] Yes

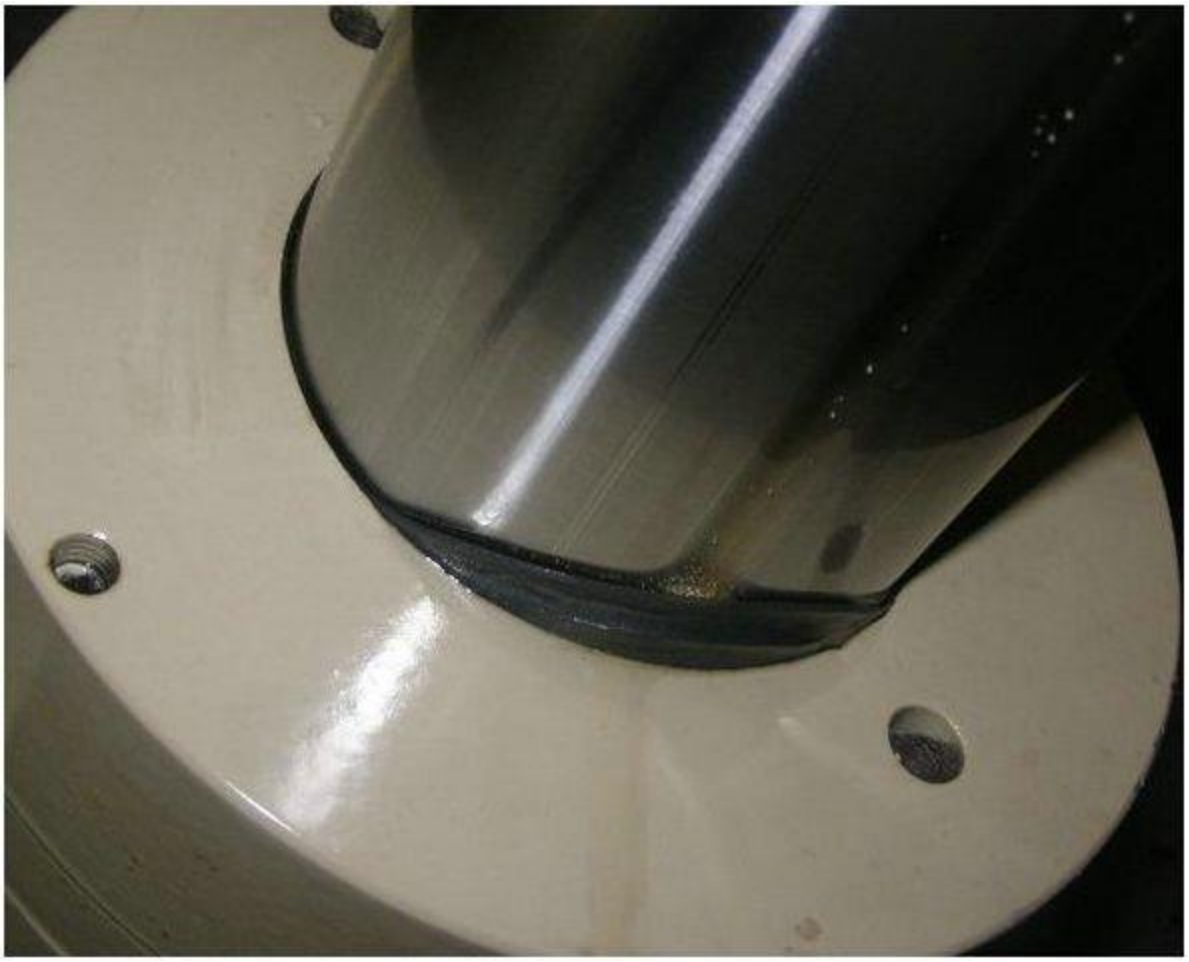
2] No

3] I don't know

- **Explanation**
  IN THE HUB:

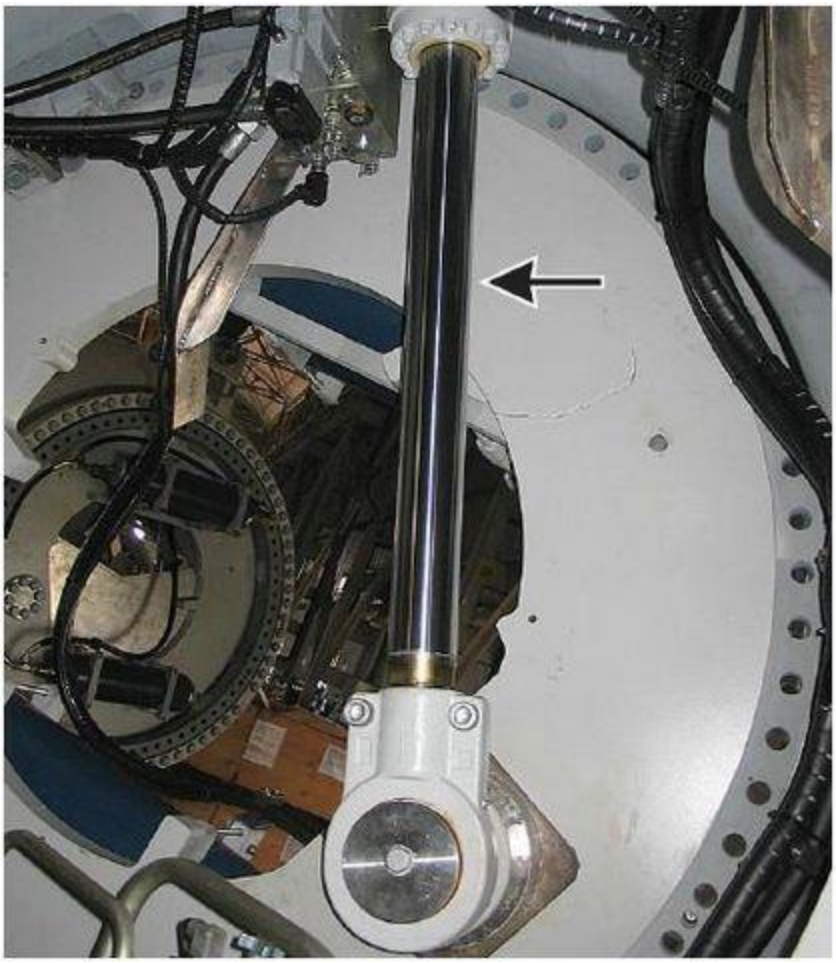
Check the actuator rod surface thoroughly for any punch mark or damage.

Check the actuator seal for any damage or seal parts pressing out between the rod and rod bushing.



Check for oil leak when actuators are in operation with system pressurized.

Replace the seals or bushing/seals if there are any leaks or pressed out seals.



PARKER System:

Relevant spare parts (Parker Actuators)	
Description	**Item No.**
HYDR CYL 125/90x884 COMPLETE (actuator with manifold)	60120439
ACTUATOR, PARKER, 125/90X884, STD	60112635

ACTUATOR, PARKER, 125/90X884, ARCTIC	60112658

Relevant spare parts (Parker Bushing Including Seals)	
Description	**Item No.**
HYDR CYL BUSHING W. SEALS ø90 (seal with Bush)	60114033
Seal bushing assembly (Arctic)	60120770
Seal bushing kit arctic (with drain) Item 60120770 is included	60120769
Seal bushing kit pitch actuator (with drain) Item 60114033 is included	60120762

Relevant spare parts (Parker Bushing Seals only)	
Description	**Item No.**
Double wiper ring PT1 (STD)	60120773
OMEGAT Rod seal OMS-MR (STD)	60120774
O-ring 115 x 5 (STD)	60120779
Back up ring STA (STD + Arctic)	60120781
Guide ring FR 90 x 95 x 9.7 (STD + Arctic)	60120782
Double wiper ring PT1 (Arctic)	60121001
OMEGAT Rod seal OMS-MR (Arctic)	60121002

O-ring 115 x 5 (Arctic)	60121003

Note: An individual Parker cylinder can be replaced with a Rexroth cylinder in any combination (example: 1 Parker and 2 Rexroth or 2 Parker and 1 Rexroth). Refer to Technical Info Sheet "TIS_V82_Replacing Parker Cyl w/Rexroth" DMS # 0059-7339 for instructions on making this conversion.

Relevant documentation	
Description	**DMS No.**
TIS_V82 Rexroth Pitch Ram install on Parker system	0059-7339

REXROTH System:

Relevant spare parts (Rexroth Actuators)	
Description	**Item No.**
HYDR CYL 140/90x884 STD+AR	60114028

HYDR CYL 140/90x884 STD+AR	60114091

Relevant spare parts (Rexroth Seal kit)	
Description	**Item No.**
ACTUATOR SEAL KIT (Seal kit alone)	60110956

Replace the defective proportional valve and/or defect cables

Does this solve the problem?

1] Yes

2] No

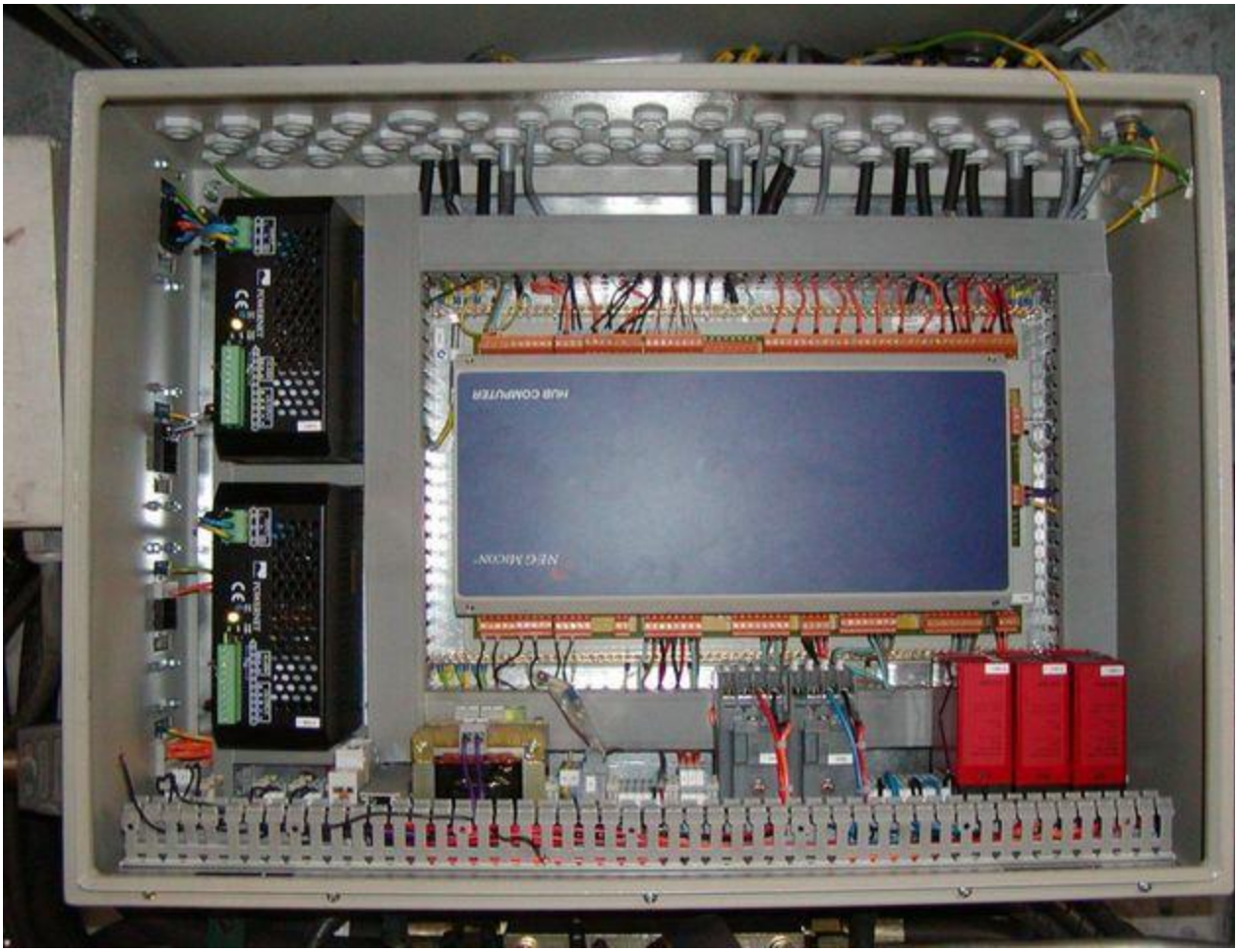
3] I don't know

- **Explanation**

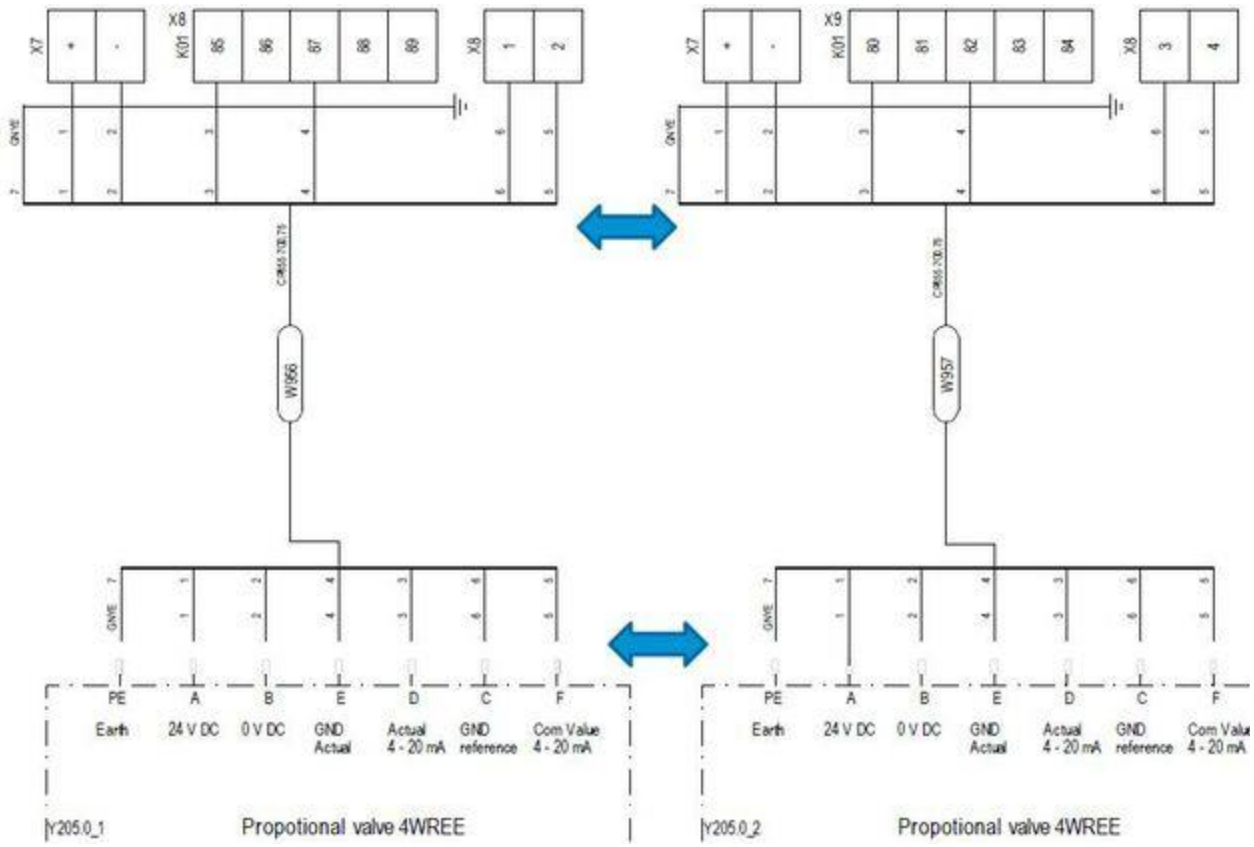
IN THE HUB:

First swap the proportional valve signal wires with those of another blade in 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 the proportional valve from affected blade to another working blade.

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

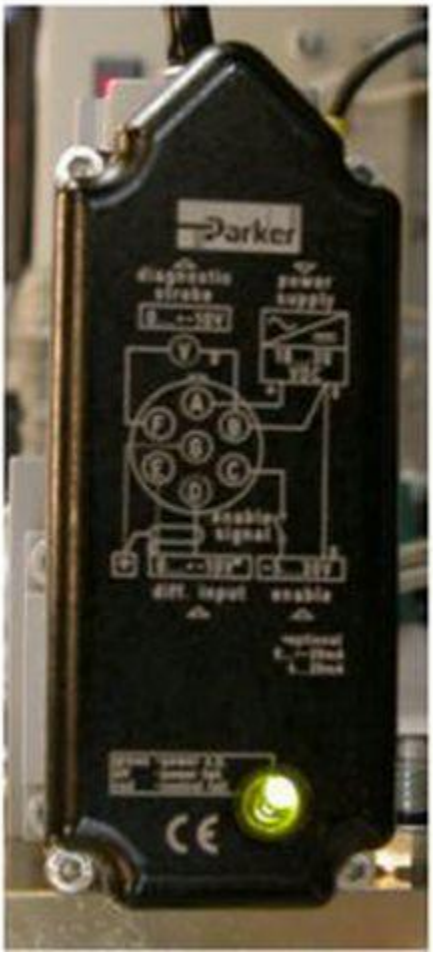
If it does not, the proportional valve is likely not the cause.

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

Relevant documentation	
Description	**DMS No.**
V82 Parker Hydraulic pitch control system	0001-3199
Replacement of proportional valve SWI	0016-1690

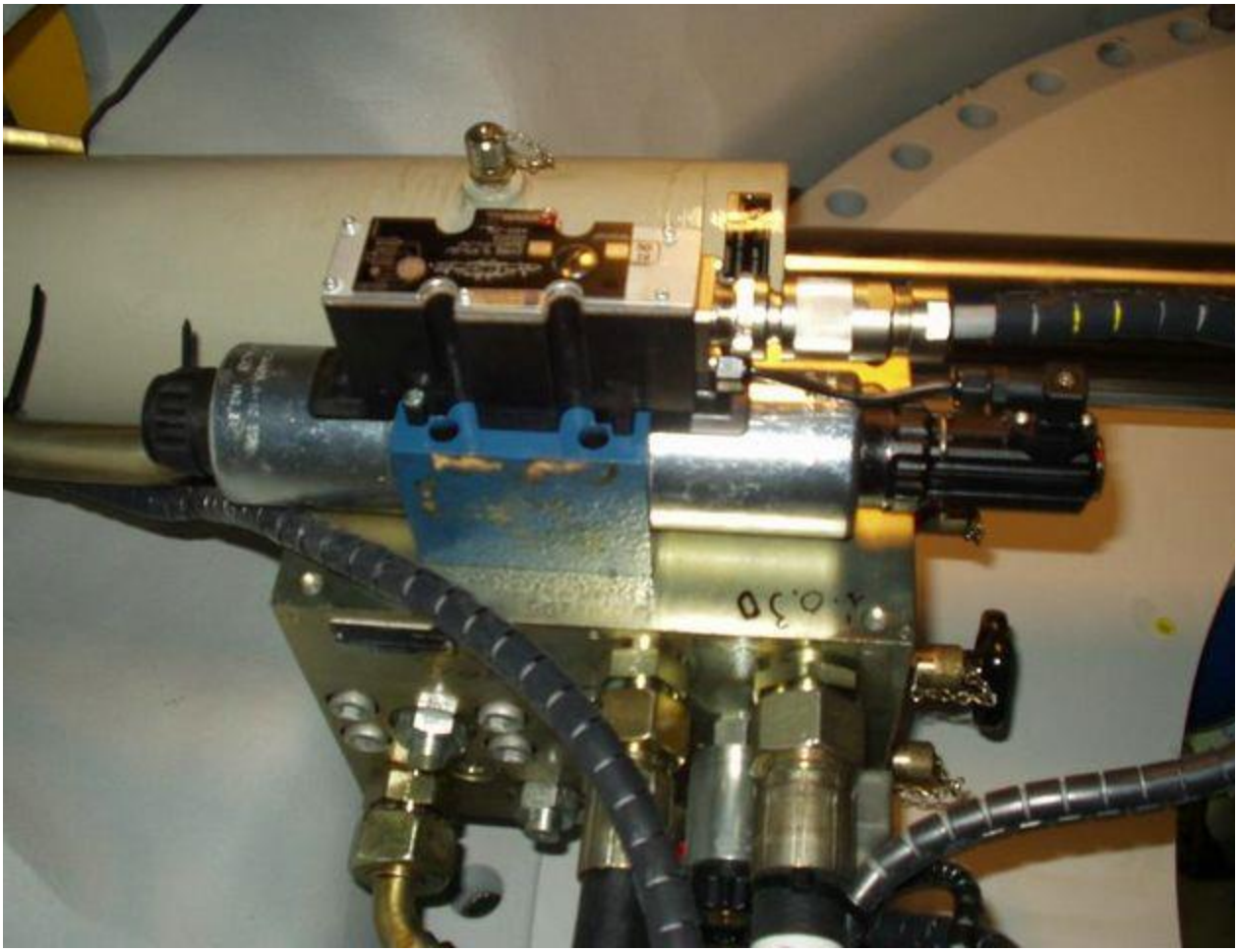
The LED should be green with the pitch system pressurized.

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

Relevant documentation	
Description	**DMS No.**
Replacement of proportional valve SWI	0016-1690



Proportional Valve Item numbers:

Rexroth:

Relevant spare parts	
Description	**Item No.**

Rexroth - PROP VAL 4WREE 10R75-2X/G24K31	60078979

Relevant CIM case		
CIM case	**Task list**	**Description**
1914		Proportional valve Failure - Bosch Rexroth - V82 1.65MW

Parker:

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

Relevant CIM case		
CIM case	**Task list**	**Description**
2303	14333	Proportional valve Failure - Parker- V82 1.65MW
3382	14333	Proportional valve Failure - Parker- V82 1.65MW - Post improvement
3516	14333	Proportional valve Failure - Parker- V82 1.65MW - Post improvement oil leakage

Part number for Proportional valve Cable

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