Replace the defect valves

Does this solve the problem?

1] Yes

2] No

3] I don't know

- **Explanation**
  IN THE HUB:

Check the hydraulic circuit diagram.

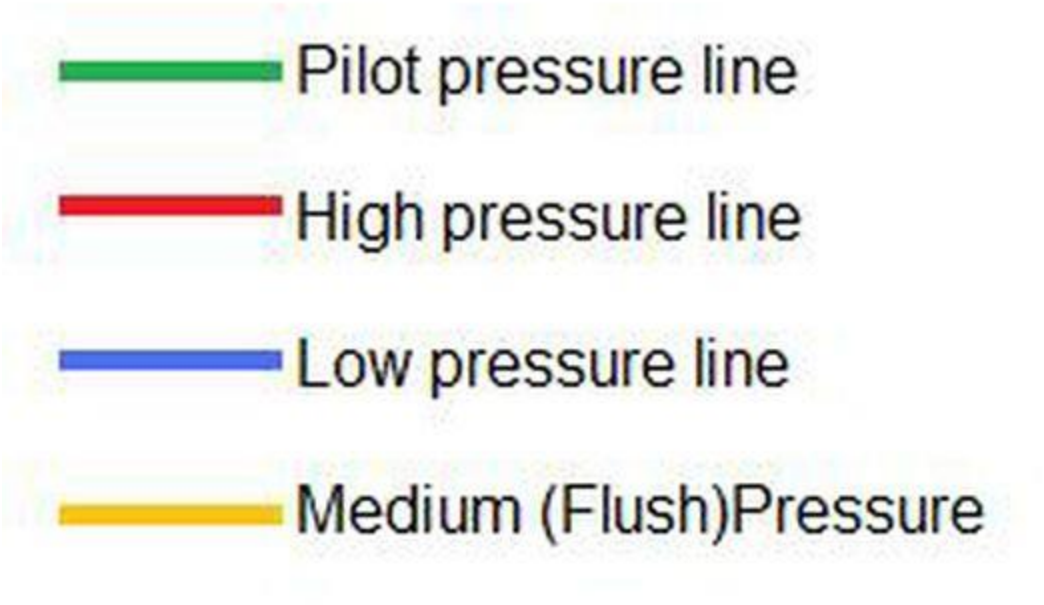
Relevant documentation	
Description	**DMS No.**
Pitch Hydraulic circuit (Parker) Main manifold Diagram	5003018
Pitch Hydraulic circuit (Parker) Pitch manifold Diagram	5003013
Pitch Hydraulic circuit (Rexroth) Main manifold Diagram	5003347
Pitch Hydraulic circuit (Rexroth) Pitch manifold Diagram	5003025
Pitch Hydraulic circuit (Rexroth) Filter manifold Diagram	5002046

Check the three blade pitch pressure through controller if any drop while turbine in the operation.

If anyone blade pitch pressure is drop –check the affected blade pitch hydraulic system.

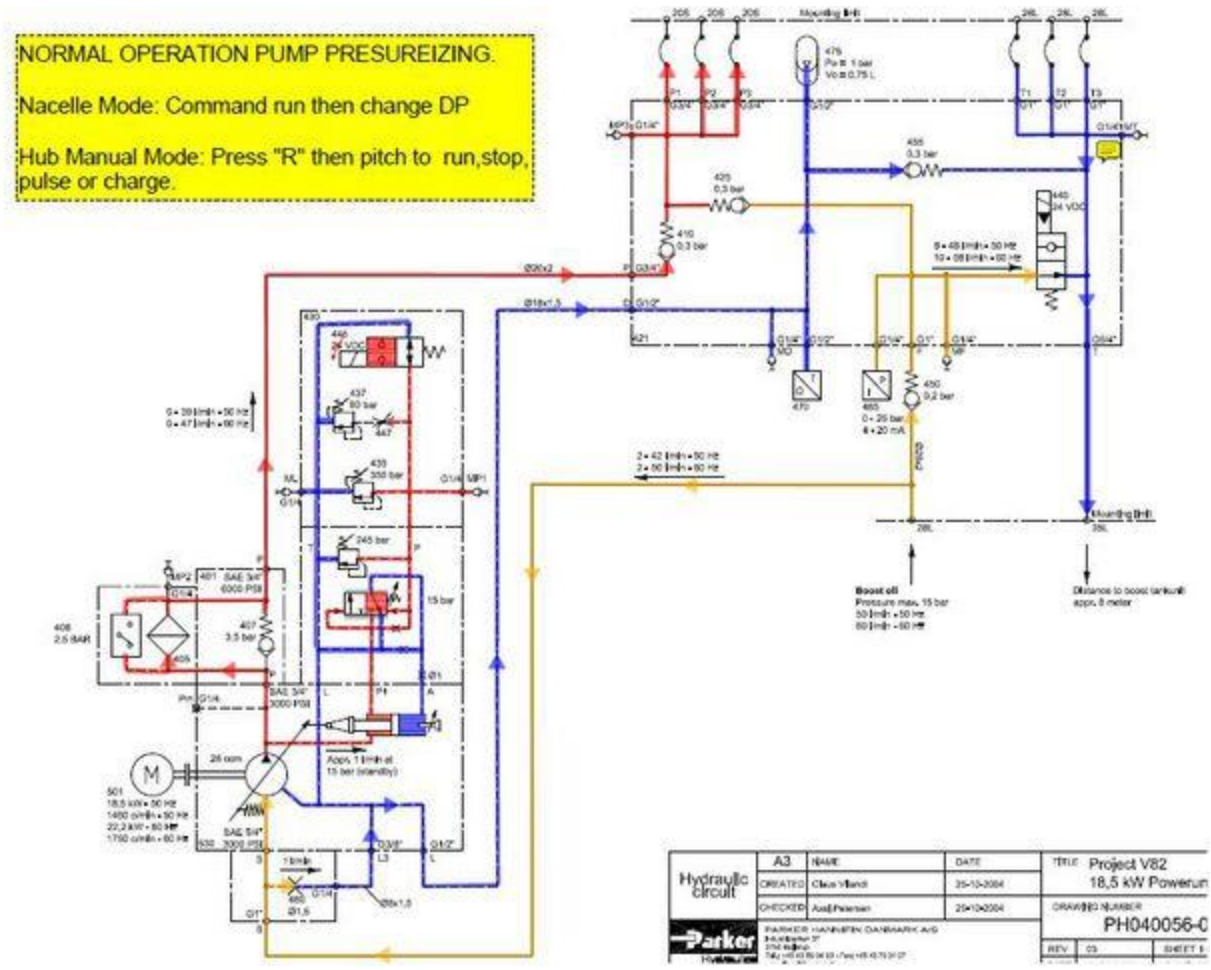
If all three pitch pressure is drop – check the main distribution block hydraulic system.

Circuit pressure line reference:



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

Main distribution block when pump pressurizing mode:



Check the below position valves,

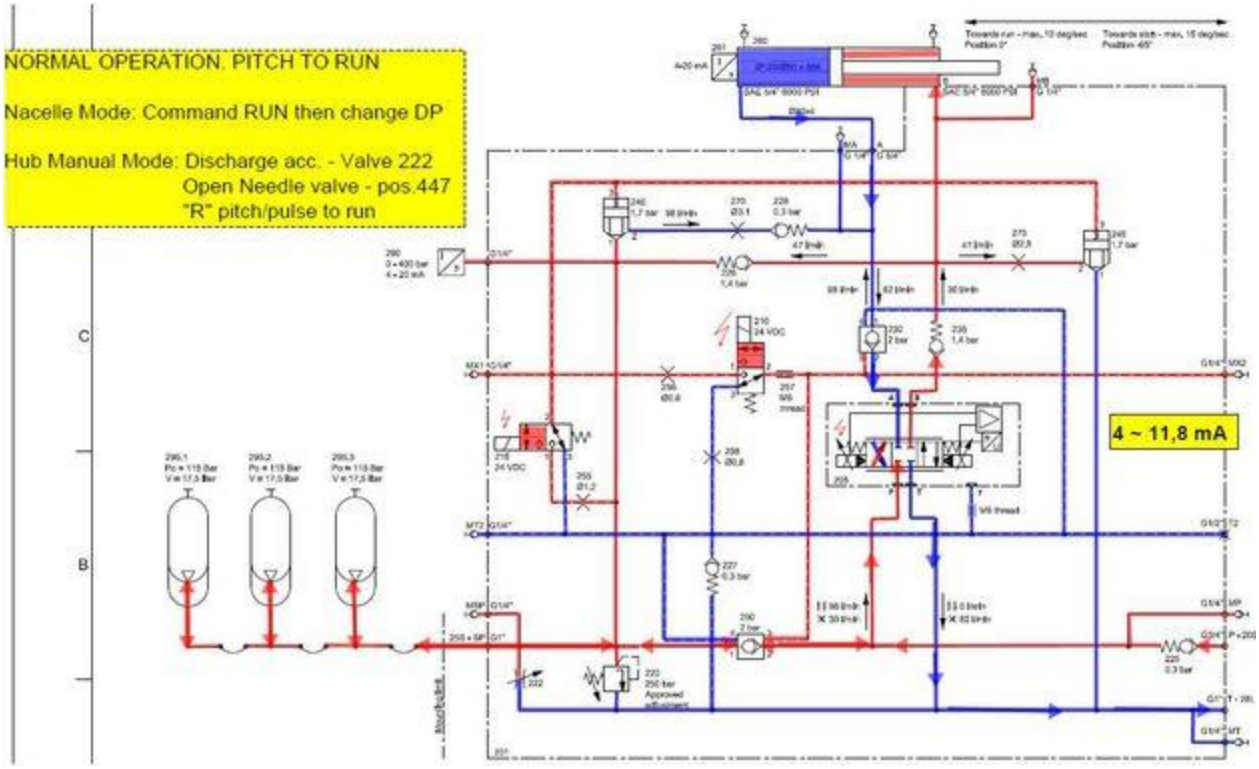
Check the valve operation. If valve defect replace with new.

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 below position valves,

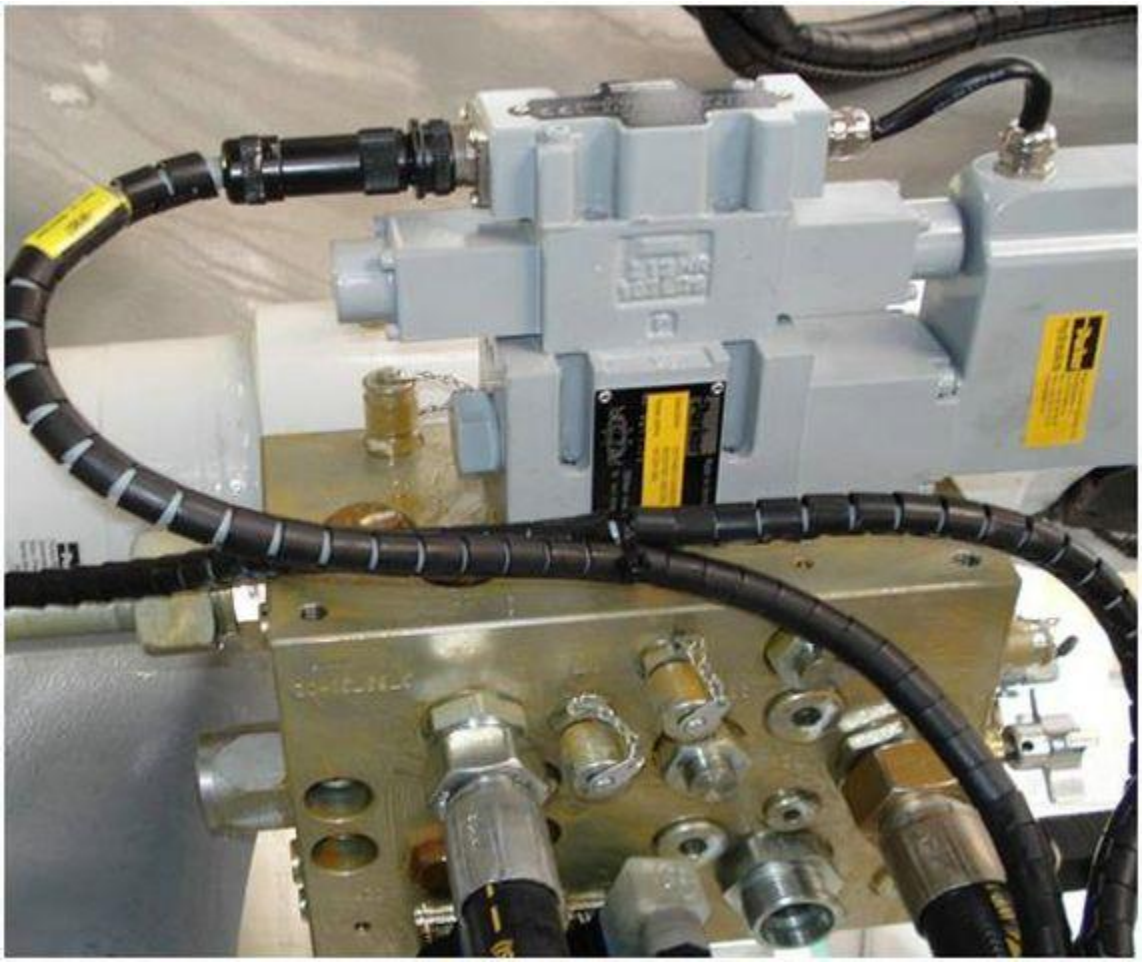
Swap the valves one by one in to other manifolds and check valve operation.

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

Part number for valves:

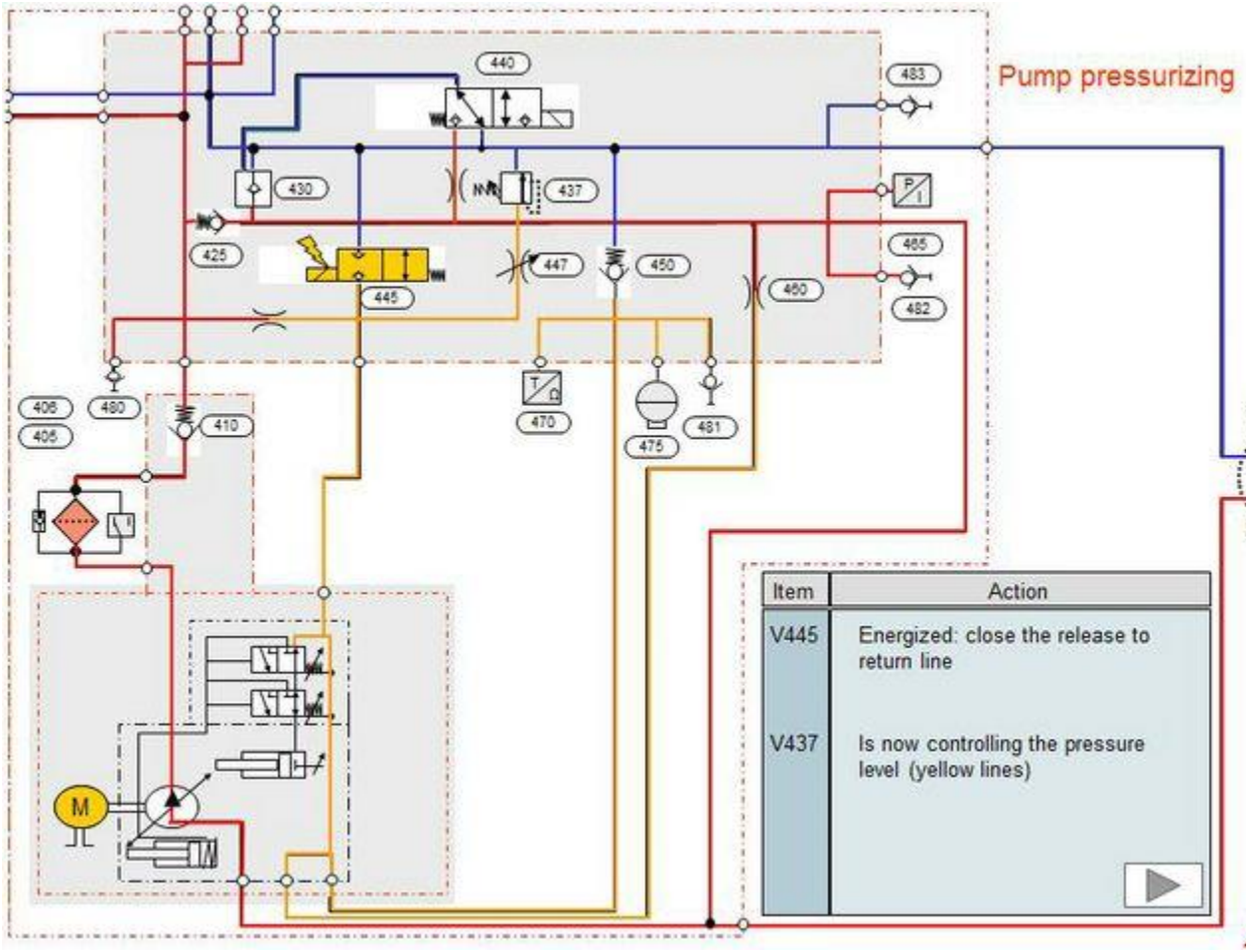
Relevant spare parts		
Description	**Item No.**	**Position**
CHECK VALVE PILOT:CVEV-XCN A30	60096481	230, 250

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 below position valves,

Check the valve operation. If valve defect 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

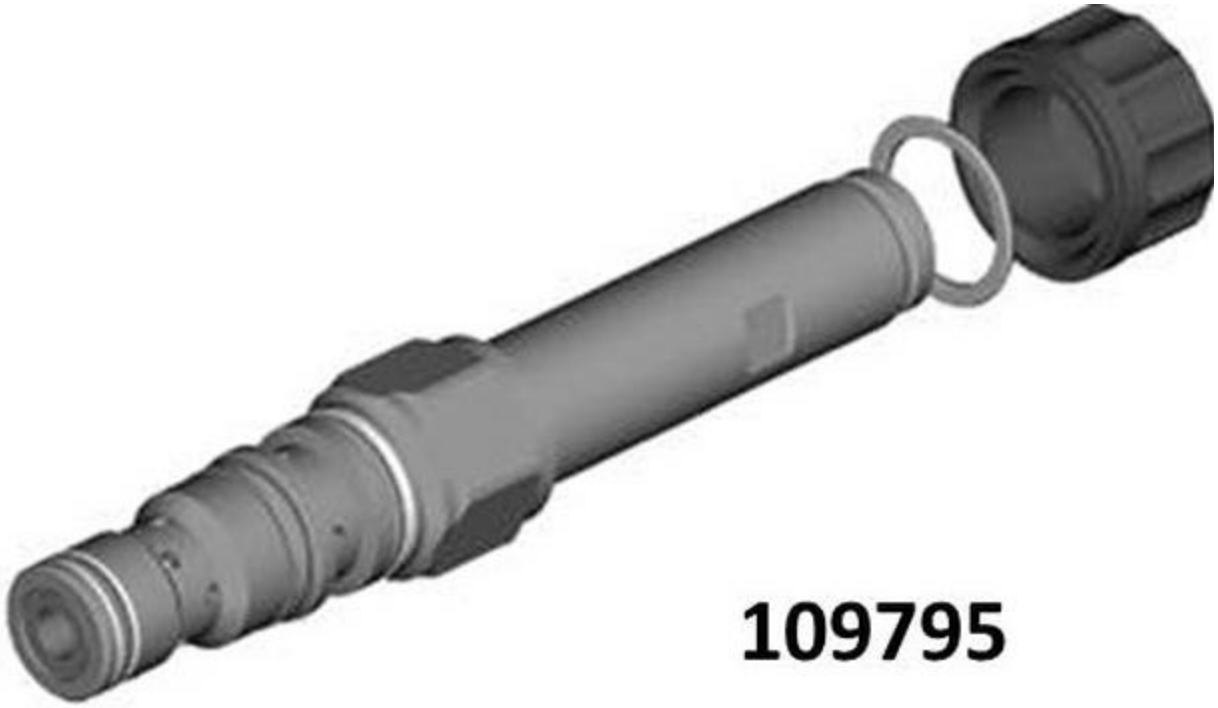
The part No.60096475 is phased out and henceforth replaced by 109795 & 60106201.

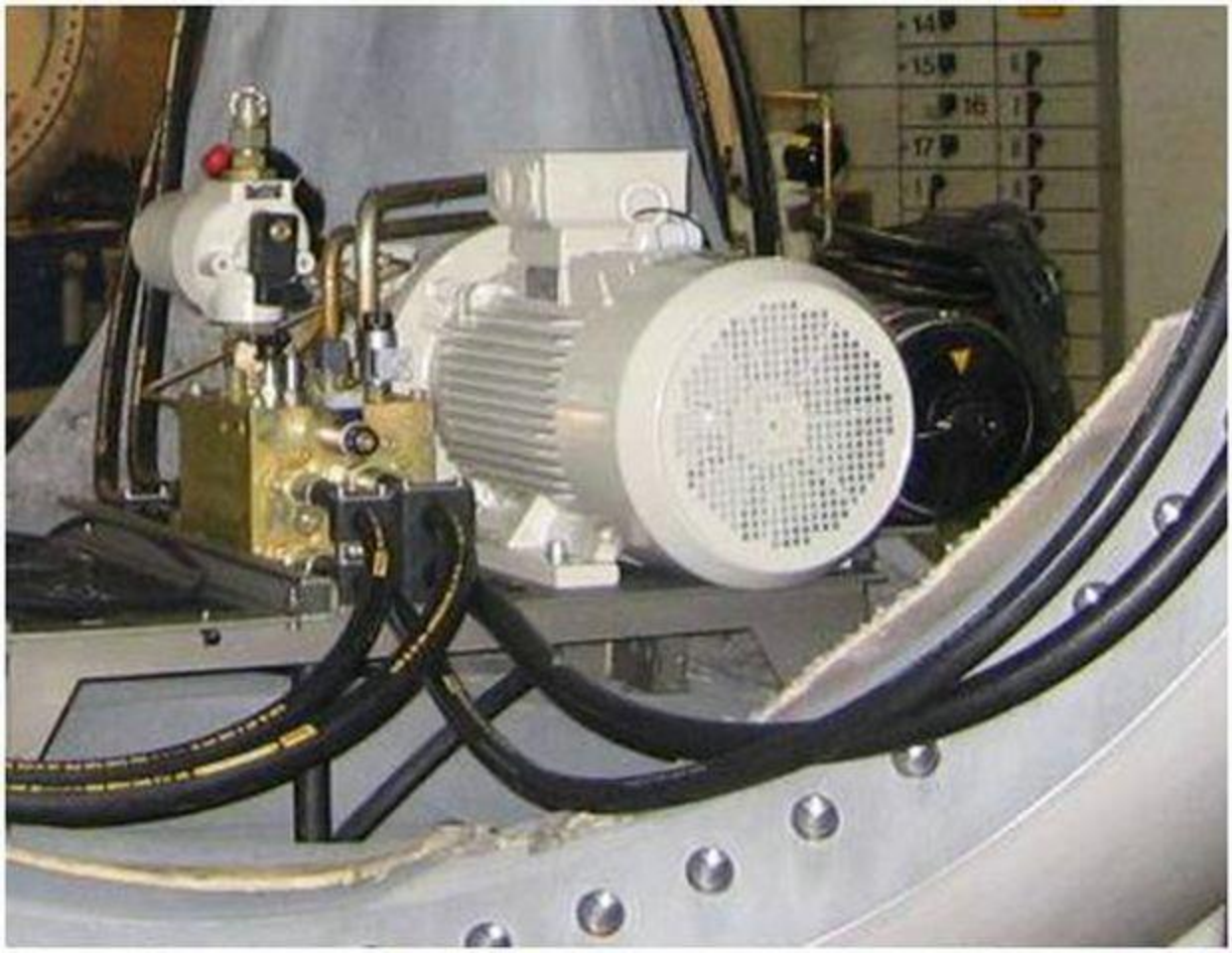
Pos. 210 & 215

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

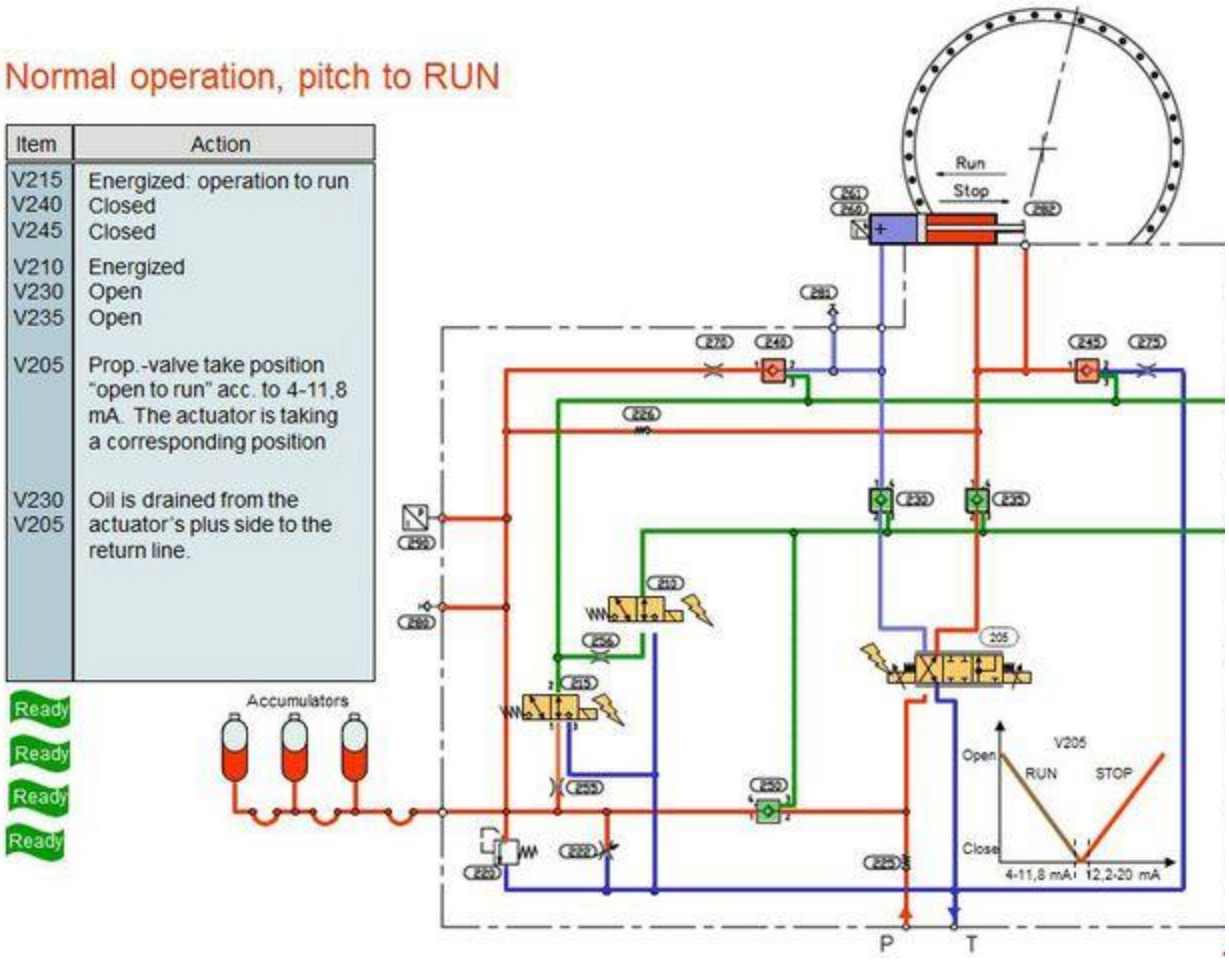
(Rexroth) Valve/Solenoid


109795



REXROTH SYSTEM -PITCH MANIFOLD:

Pitch distribution block when turbine in ready for operation mode:



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 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 A30	60096481	230, 235, 250
VALVE CHECK PILOT COFA-XAN A30	60096493	240, 245

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

(Rexroth) Valve/Solenoid(Pos. 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

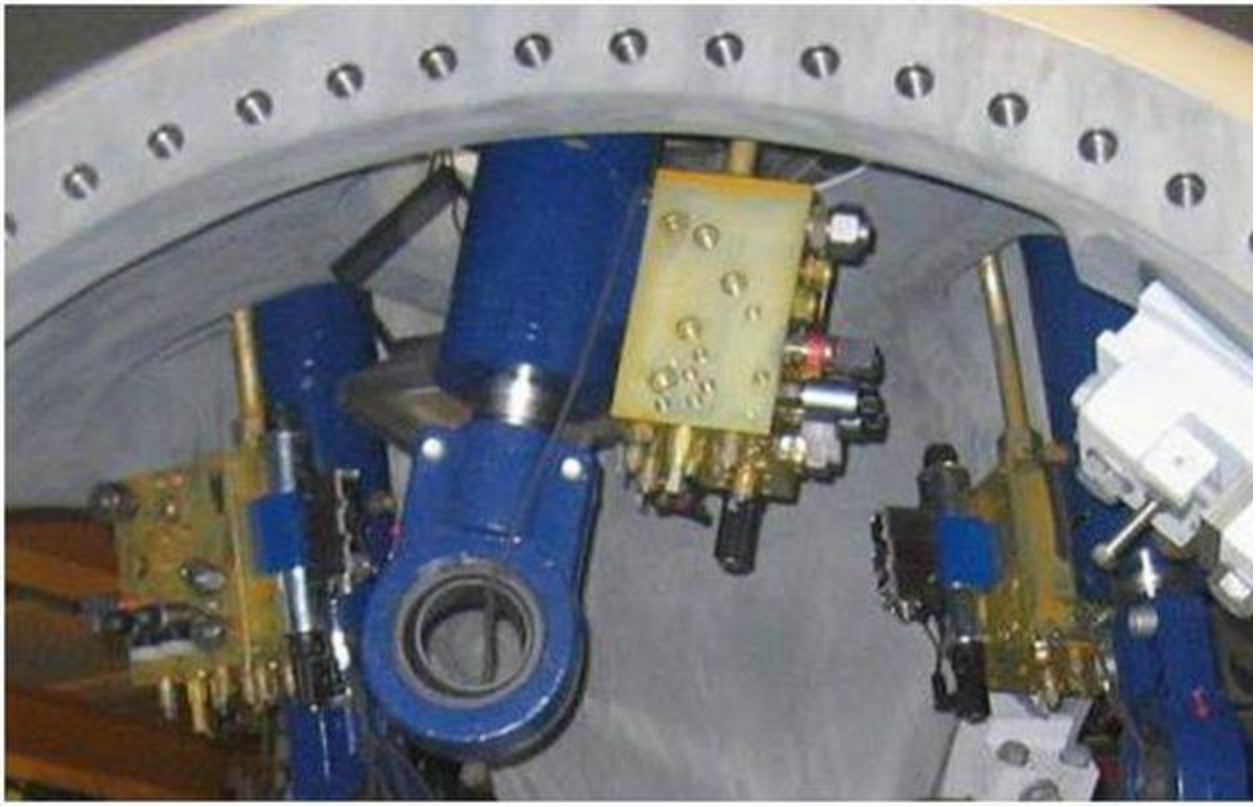
REXROTH NEEDLE VALVE TYPE-1 (POS: 447, 222)

Relevant spare parts

Description	Item No.
THROTTLE VALVE: NFBC-KCN A3031	60096478
HANDLE FOR NFBC-KCN A30316JG01	60109005

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

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



Refer 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	1000778
Fast Active Stall System	0001-1672

Check the compensator valve setting and replace the defect valve

Does this solve the problem?

1] Yes

2] No

3] I don't know

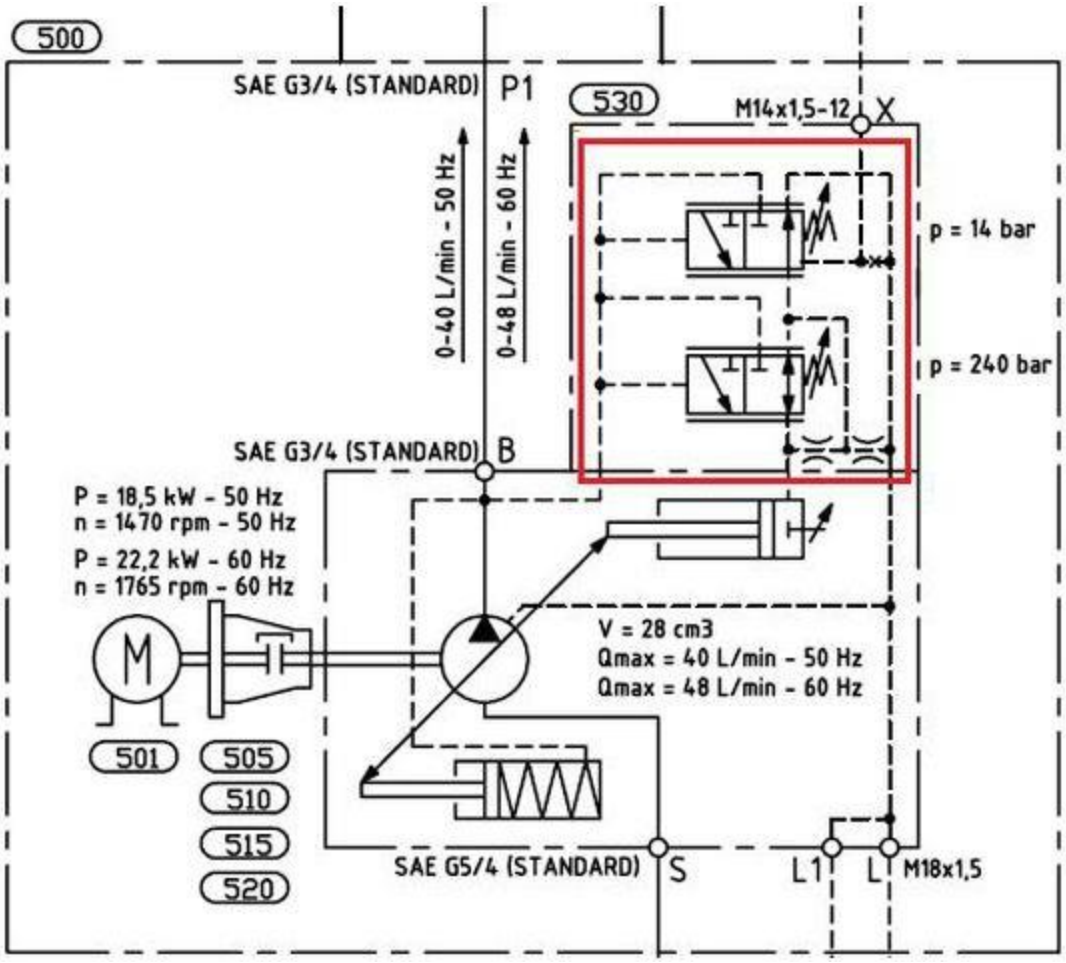
- **Explanation**

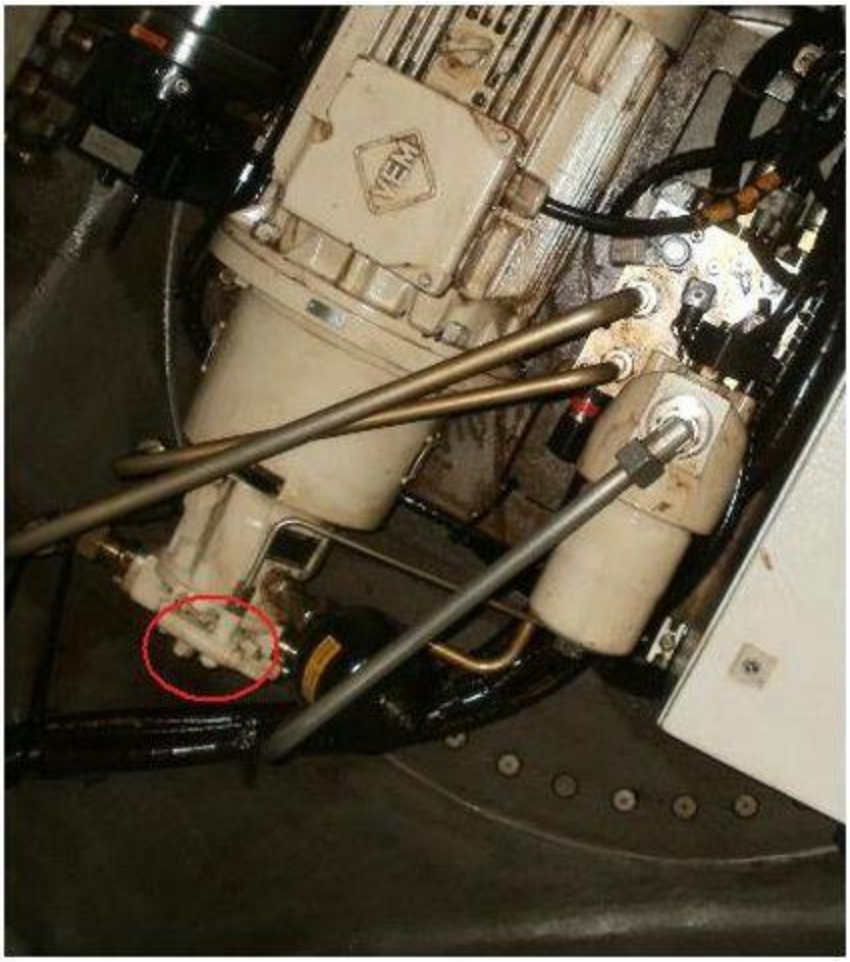
IN THE HUB:

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

Relevant documentation	
Description	**DMS No.**
Pressure Relief Valve Setting	0006-8149

REXROTH SYSTEM:

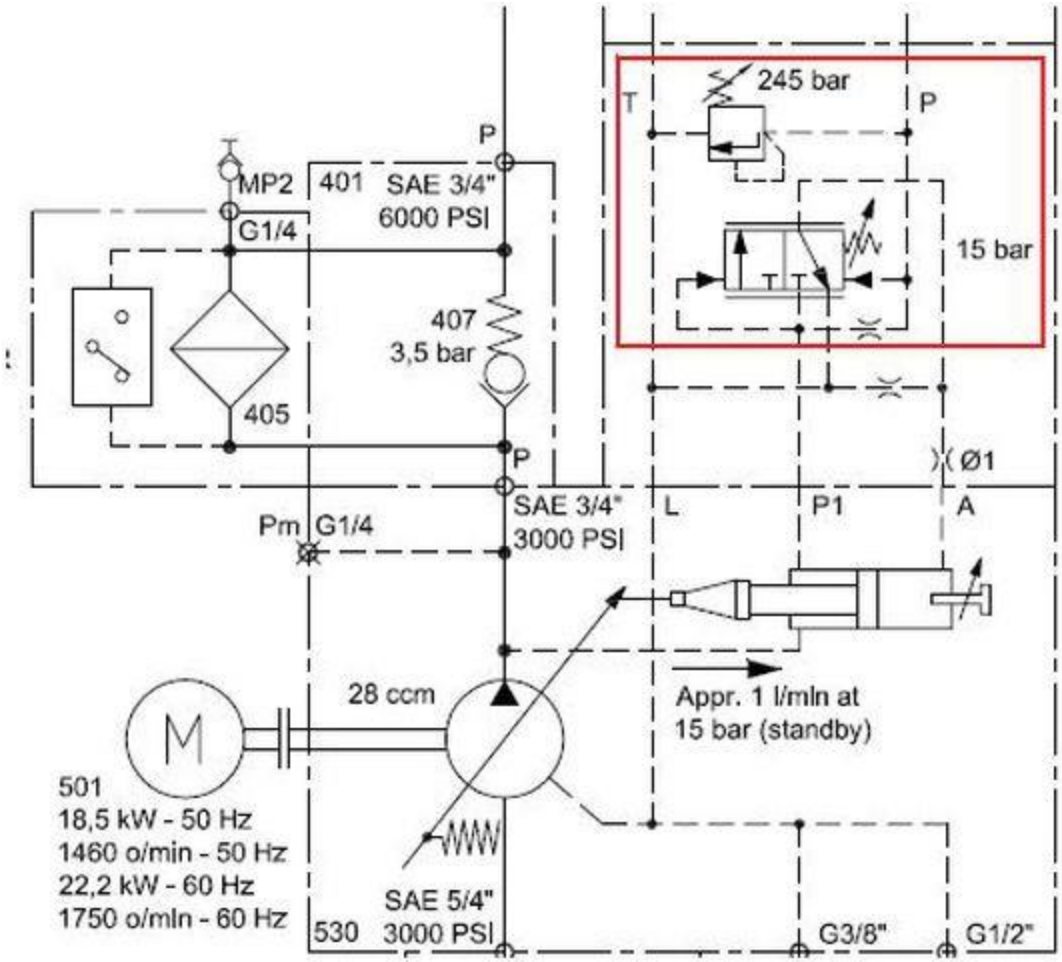

500
SAE G3/4 (STANDARD)
P1
530
M14x1,5-12
X
0-40 L/min - 50 Hz
0-48 L/min - 60 Hz
p = 14 bar
p = 240 bar
SAE G3/4 (STANDARD)
B
P = 18,5 kW - 50 Hz
n = 1470 rpm - 50 Hz
P = 22,2 kW - 60 Hz
n = 1765 rpm - 60 Hz
M
V = 28 cm3
Qmax = 40 L/min - 50 Hz
Qmax = 48 L/min - 60 Hz
501
505
510
515
520
SAE G5/4 (STANDARD)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

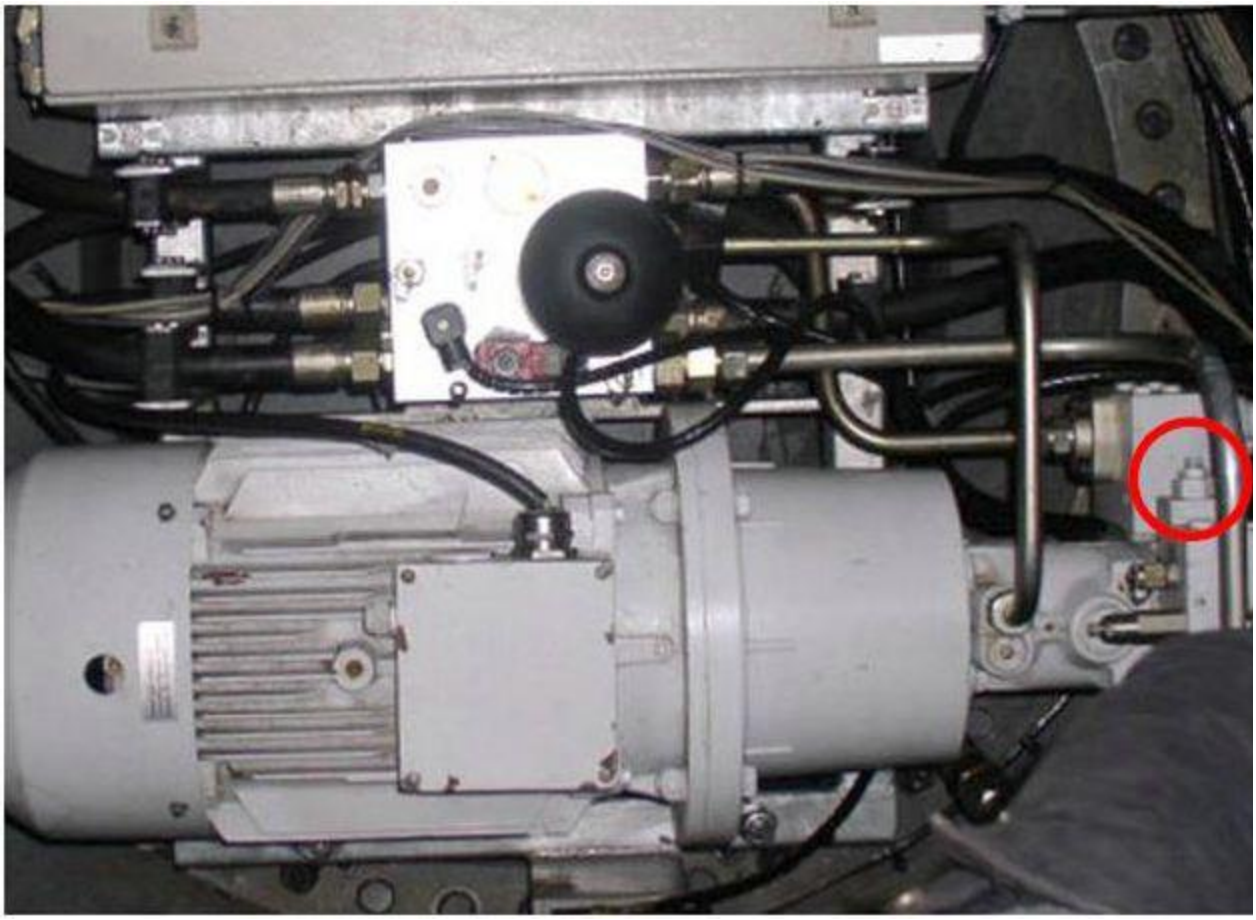


Part number for Rexroth compensator valve:

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

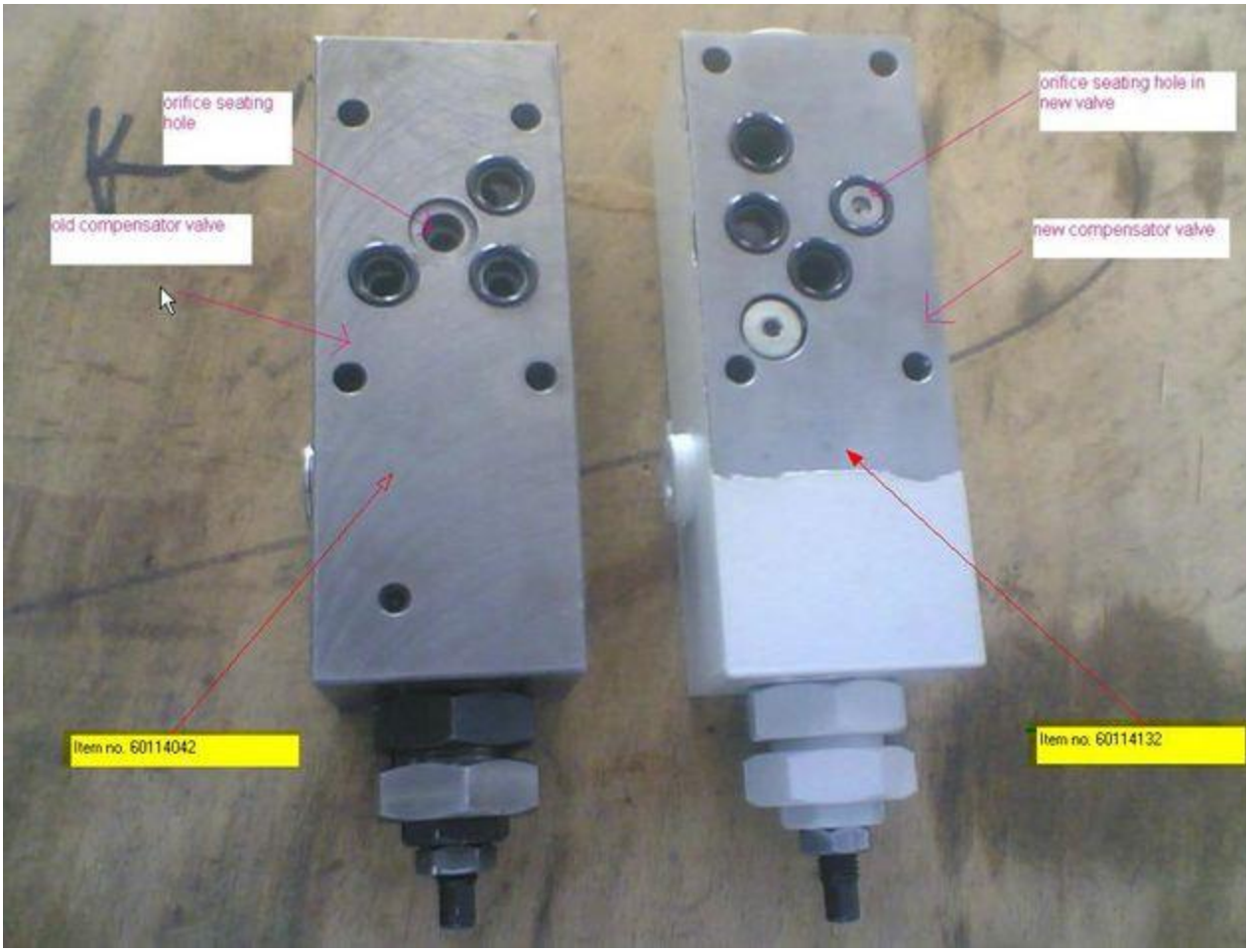
PARKER SYSTEM:


245 bar
T
P
15 bar
P
MP2
401
SAE 3/4"
6000 PSI
G1/4
407
3,5 bar
405
P
Ø1
SAE 3/4"
3000 PSI
L
P1
A
Pm
G1/4
28 ccm
Appr. 1 l/mln at
15 bar (standby)
M
501
18,5 kW - 50 Hz
1460 o/min - 50 Hz
22,2 kW - 60 Hz
1750 o/mln - 60 Hz
SAE 5/4"
530
3000 PSI
G3/8"
G1/2"



In parker hydraulic system have two different type of compensator valve,

Ensure the valve type before replacing new valve.



Part number for Parker compensator valve:

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

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

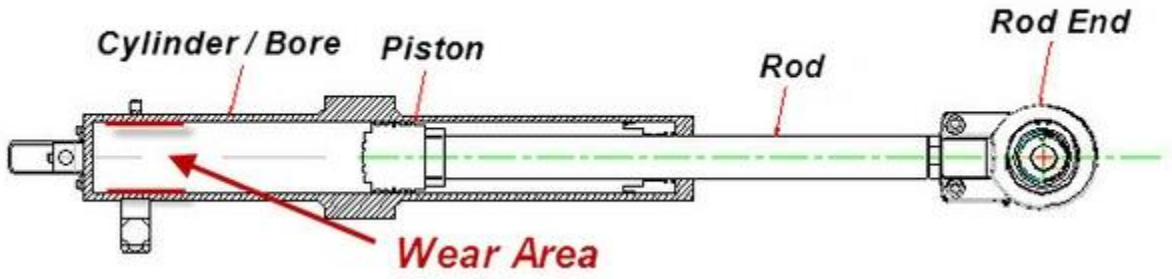
Does this solve the problem?

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 defect Proportional Valve and defect cables

Does this solve the problem?

1] Yes

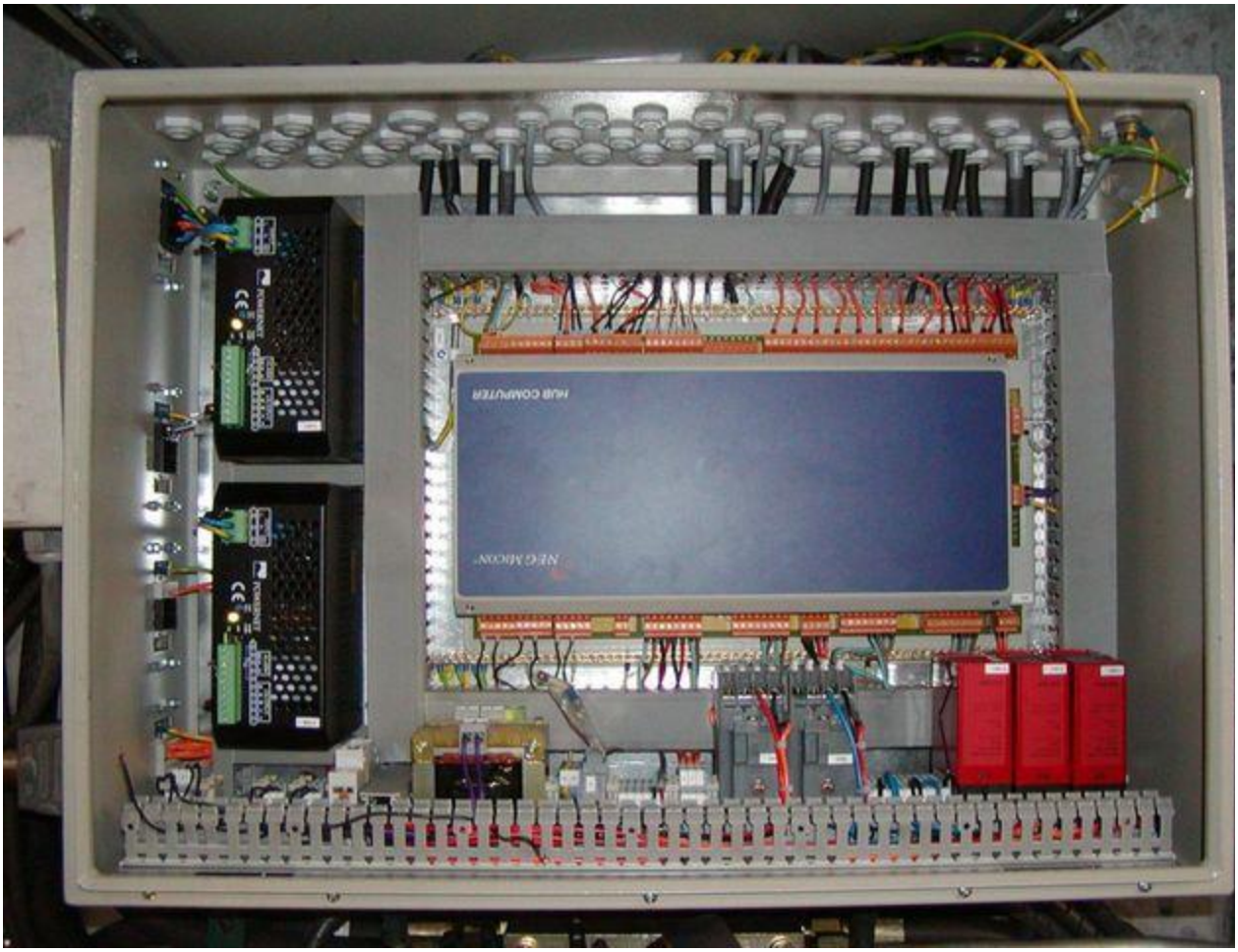
2] No

3] I don't know

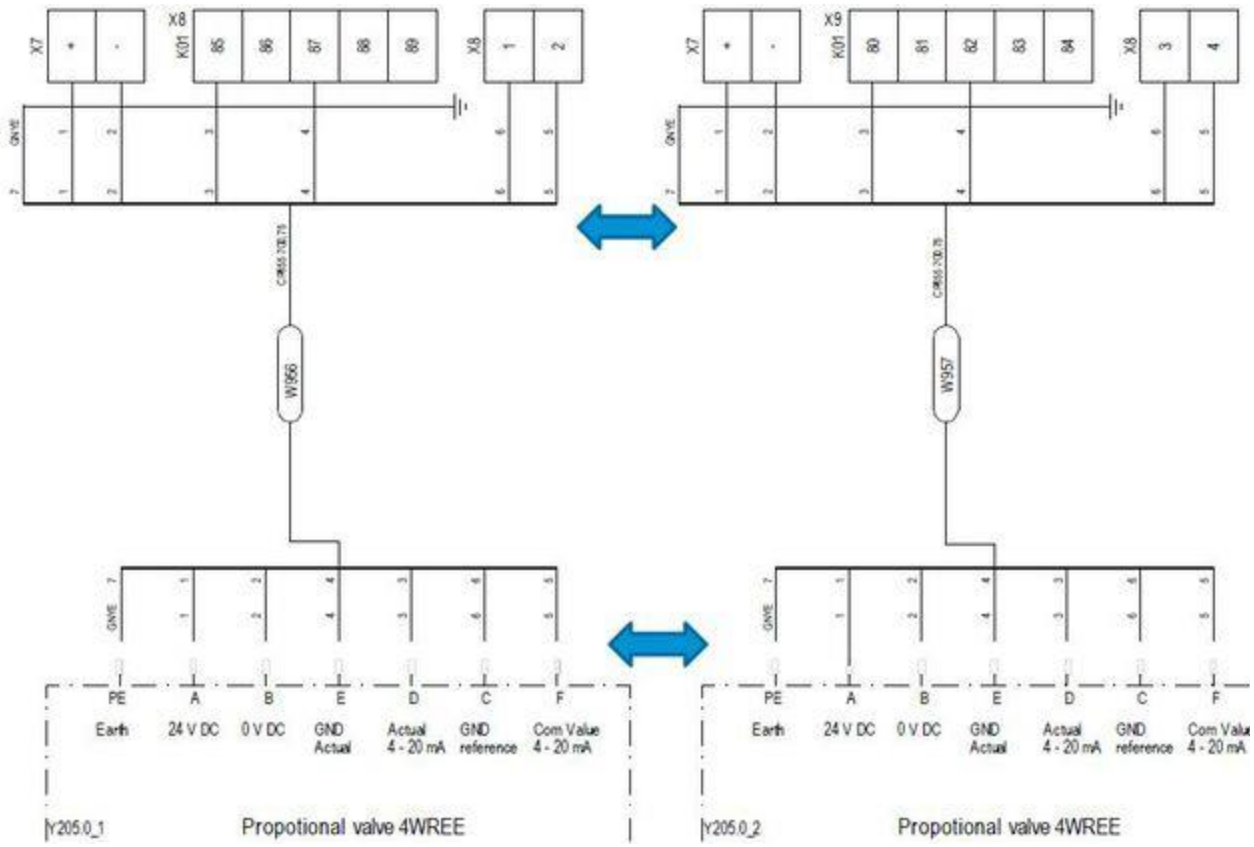
- **Explanation**
  IN THE HUB:

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.

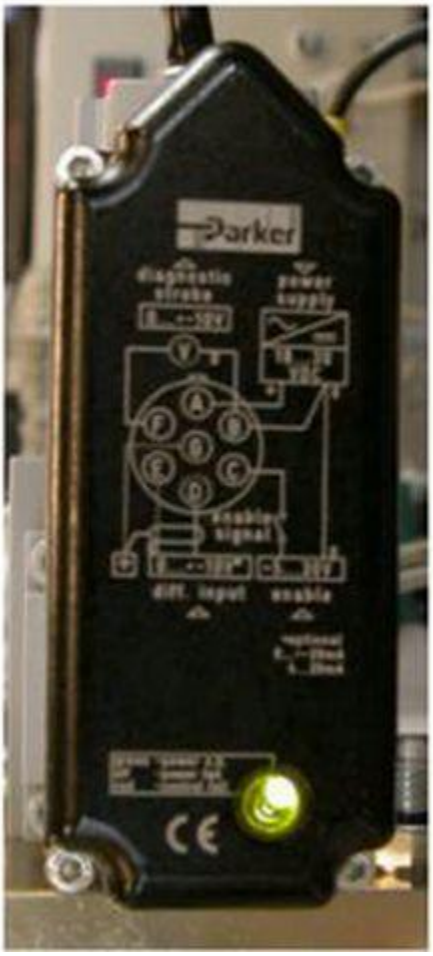
For Parker proportional valves check to see the color of the LED on the valve circuit board.

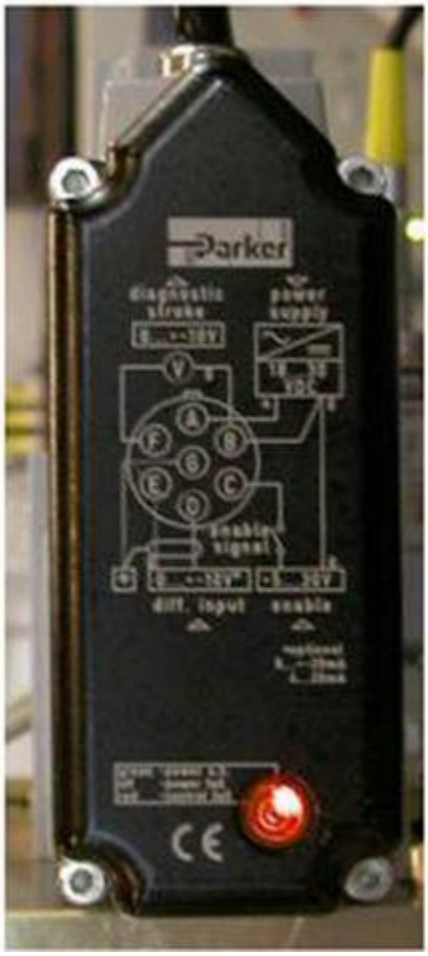
Relevant documentation

Description	DMS No.
V82 Hydraulic pitch control system	0001-3199

The LED should be green with the pitch system pressurized.

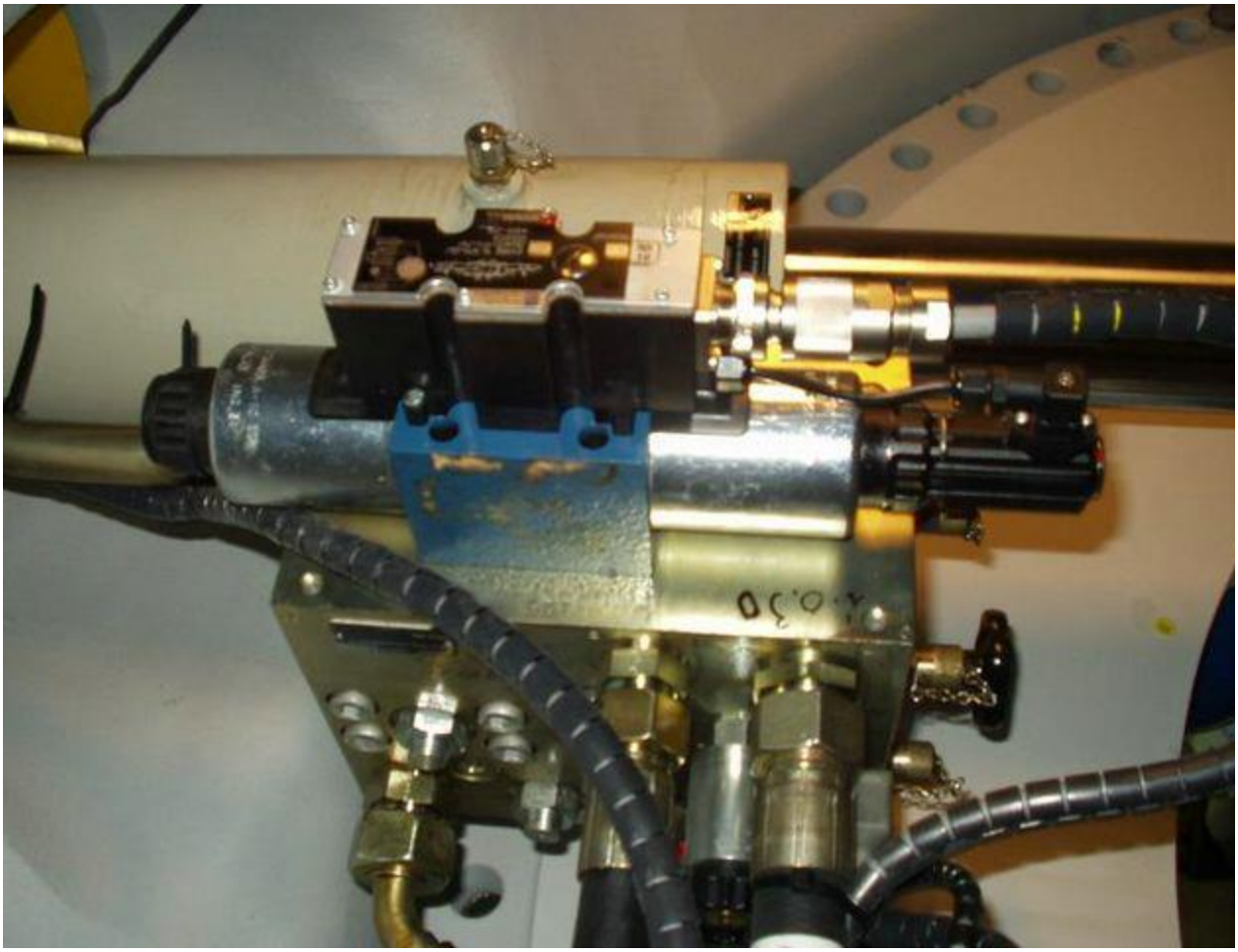
If it is red and there is pressure verified on test port MP, then the valve may also be defective.

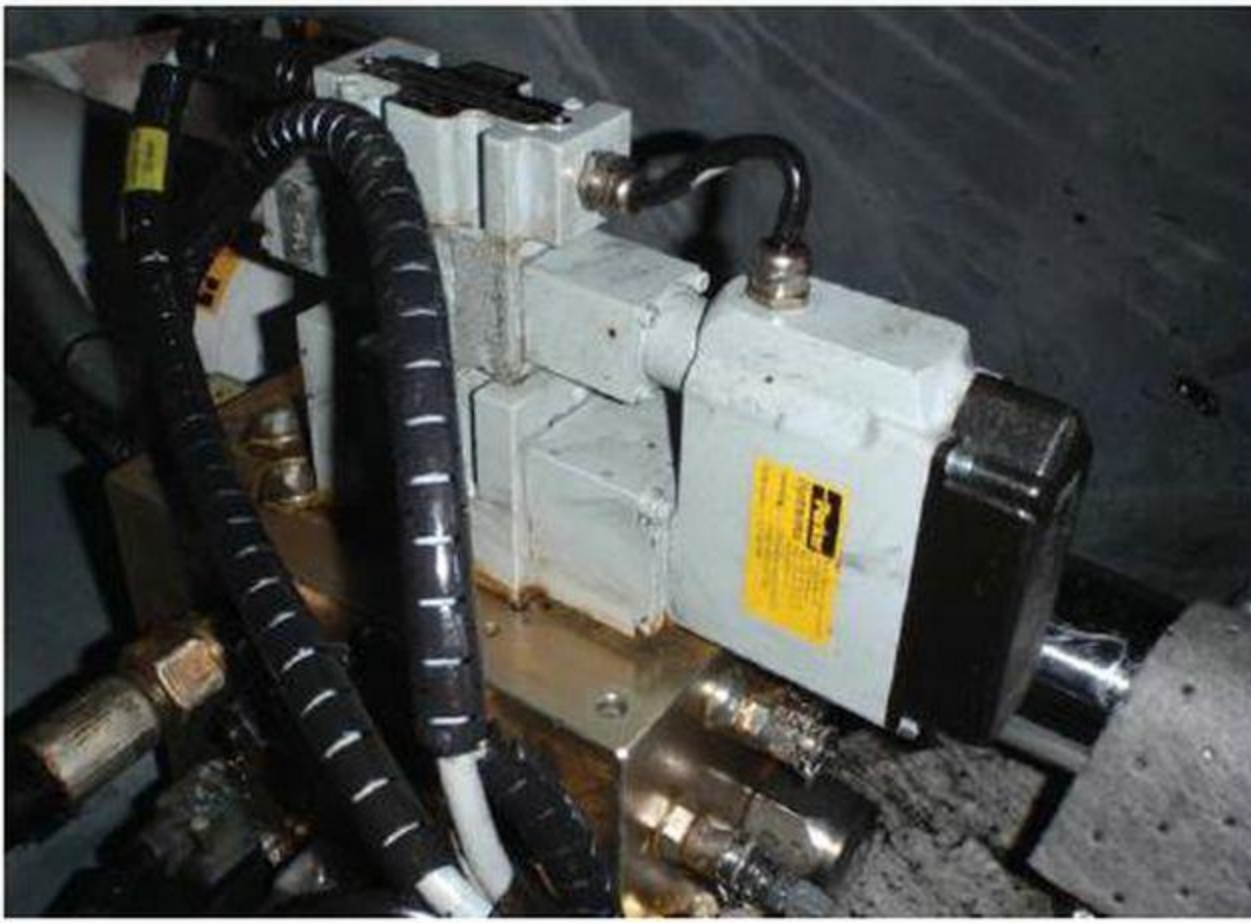




Display Color	Indicates
Green	Normal operation
Off	Supply voltage outside permissible range of 18 to 30 VDC
Red	Spool position error / Low pilot pressure

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





Proportional Valve Item numbers:

Relevant spare parts		
Description	**Item No.**	
PROP. VALVE D31FHE01C	60112621	Parker
PROP VAL 4WREE 10R75-2X/G24K31	60078979	Bosch Rexroth
Cable W 956 Proportional valve Y0205.0-1	60021544	

CIM:

Relevant CIM case		
CIM case	**Description**	**Task list**
2303	Proportional valve failure – Parker V82 1.65MW	14333
1914	Proportional valve failure – Bosch Rexroth V82 1.65MW	14334

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.

Low pressure accumulators also cause this alarm.

If any low pressure accumulators recharge as per SWI

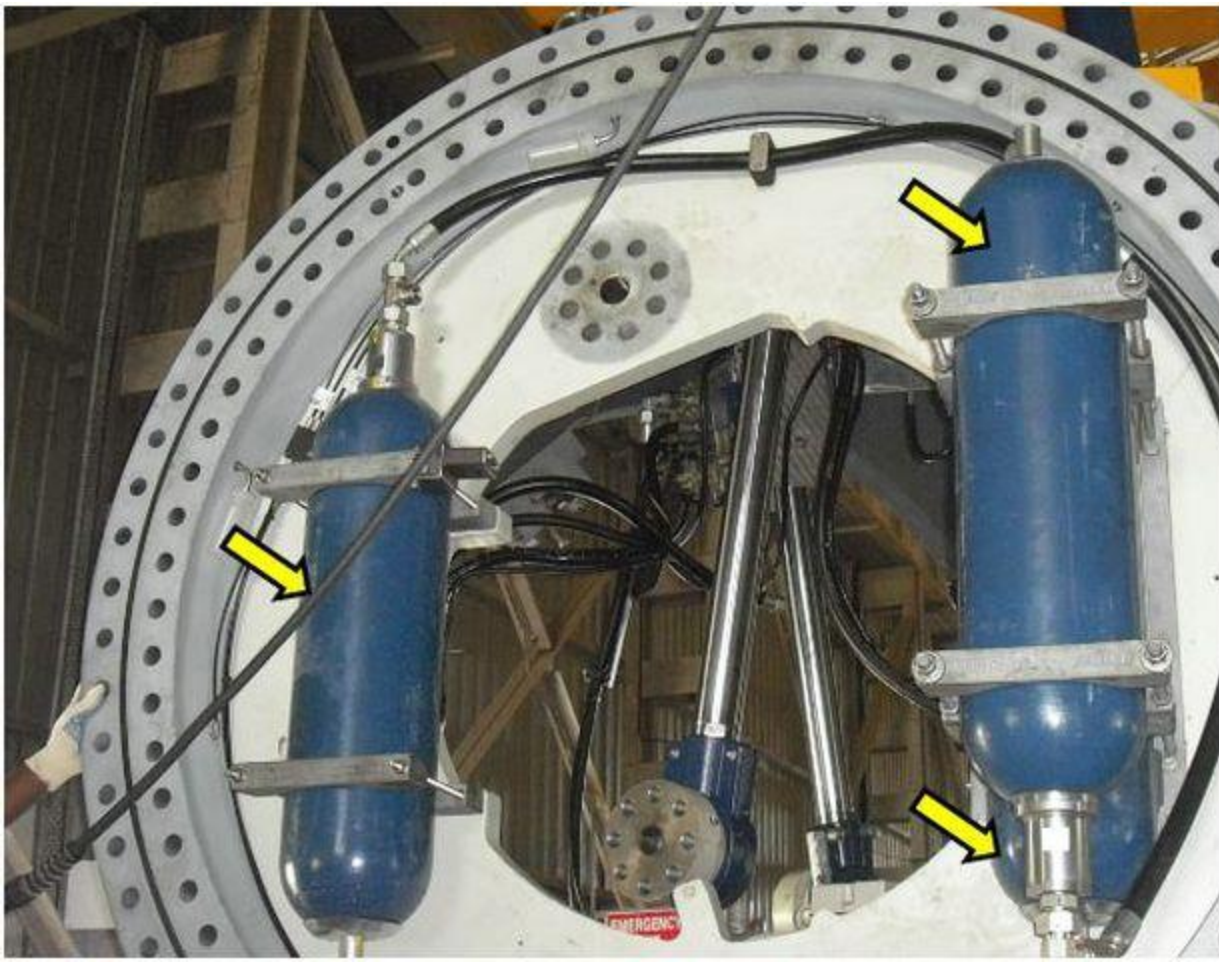
Relevant documentation	
Description	**DMS No.**
Charging of Nitrogen Accumulators	941918
Blade Accumulator Exchange	0001-2871

If any failure accumulator replace with new:

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

Check accumulator retrofit installation

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



Replace the defect actuator or replace the defect seal

Does this solve the problem?

1] Yes

2] No

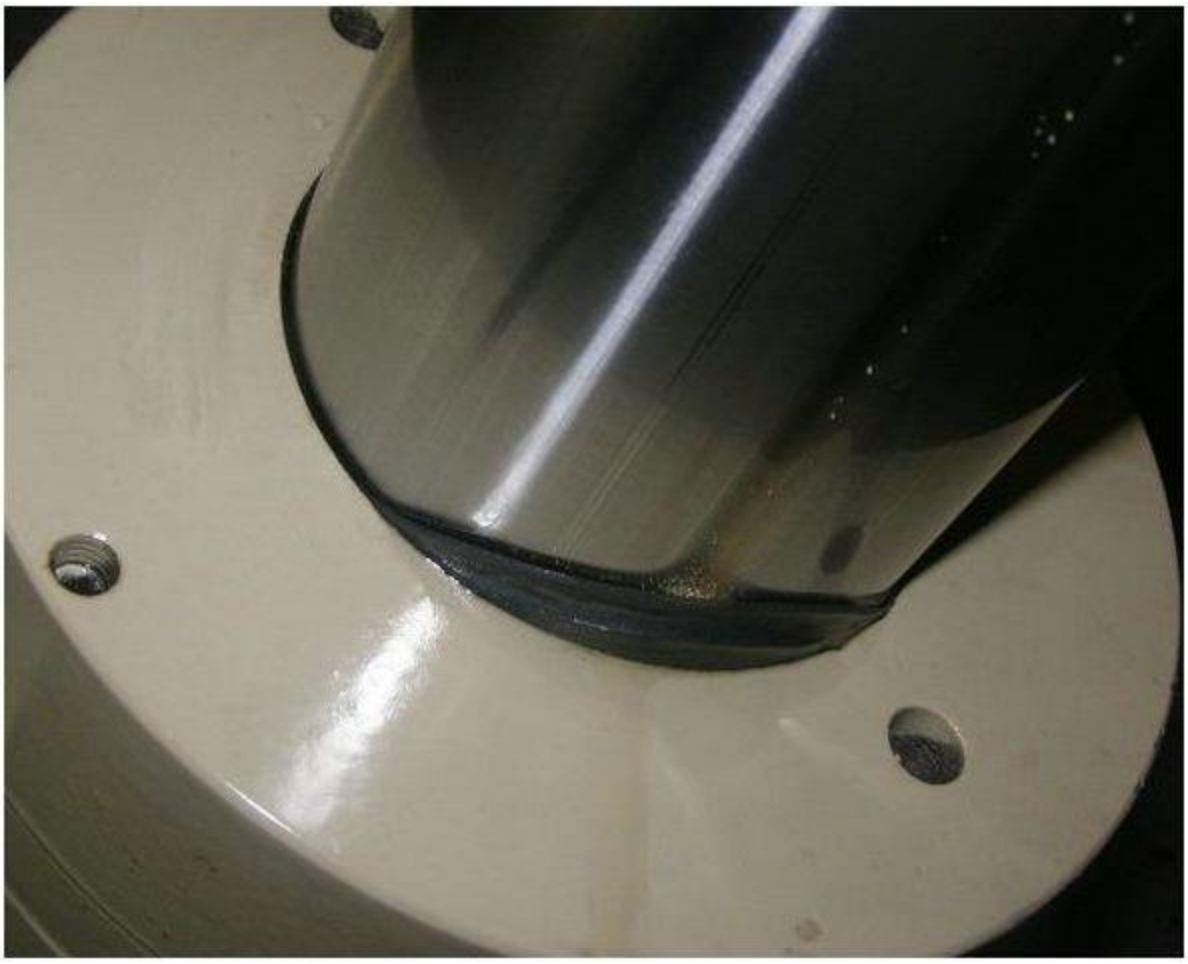
3] I don't know

Explanation

IN THE HUB:

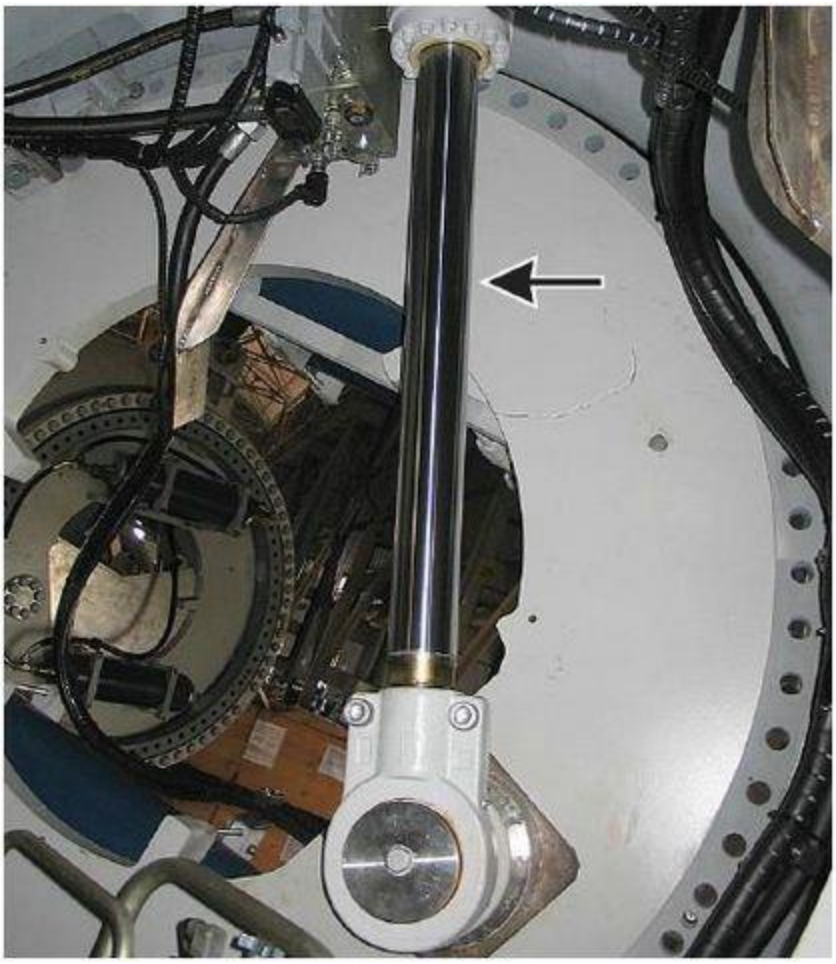
Check the Actuator rod surface thoroughly if any punch mark or damage.

Check the actuator seal if any damage or seal parts come out from push,



Check the oil leak when actuators in operation with system pressure.

If found actuator seal failure replace with new seal kit.



PARKER System:

Relevant spare parts		
Description	**Item No.**	
HYDR CYL 125/90x884 COMPLETE	60120439	Actuator with manifold
HYDR CYL BUSHING W. SEALS ø90	60114033	Seal with Bush

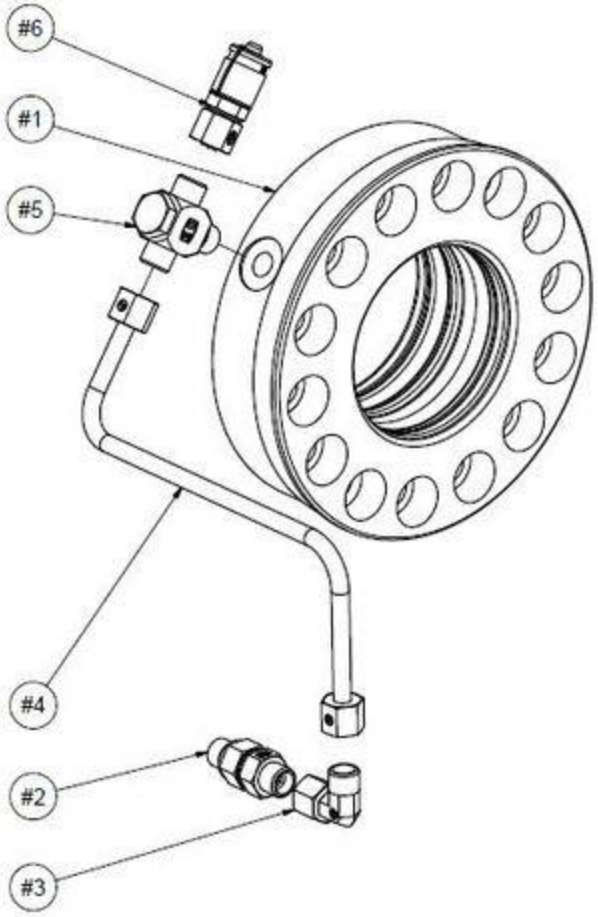
REXROTH System:

Relevant spare parts		
Description	**Item No.**	
ACTUATOR Ø140 WITH Ø100 TRUN.	60096442	Actuator with manifold
ACTUATOR SEAL KIT	60110956	Seal kit alone

Relevant documentation	
Description	**DMS No.**
V82 Pitch Actuator Exchange	0021-4366
Pitch Actuator Piston Rod Replacement	0023-2047

Parker Return Hose Part number details:

Relevant spare parts	
Description	**Item No.**
PIPE DRAINASSY	60120766
EO HIGH PRESSURE BANJO TEE	60120767
VALVE NON RETURN	60120764
SWIVEL NUT ELBOW	60120765
EO TEST POINT M16X2 FOR CONE	60120768



ITEM	TITLE
#1	Seal Bushing Assembly
#2	Non return valve - 3 bar opening pressure
#3	Swivel nut elbow
#4	Drain pipe assembly PH080236
#5	EO High pressure banjo tee
#6	EO Test Point with threaded connection M16x2 for cone

Ensure proper fixing and installation