



Calibrate blades

Does this solve the problem?

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

● [Explanation](#)

This is especially likely if the position transducer (Balluff) or hub computer have been changed just prior to the alarm. Calibrate blades by using document 0000-9925 section 5.10.9 Blade Position Calibration during manual pitching in the Nacelle Mode.

| Relevant documentation | | |
|---|-----------|---|
| Description | DMS No. | Page |
| Commissioning instruction V82 -1.65-Mk4 | 0000-9925 | Blade Position Calibration during Manual Pitching in the Nacelle Mode |



Check for loose connections and test / replace power cable

Does this solve the problem?

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

● [Explanation](#)

Check that there is a secure connection for the power cord for the proportional valve, valve 210, 215 and the position transducer (Balluff).

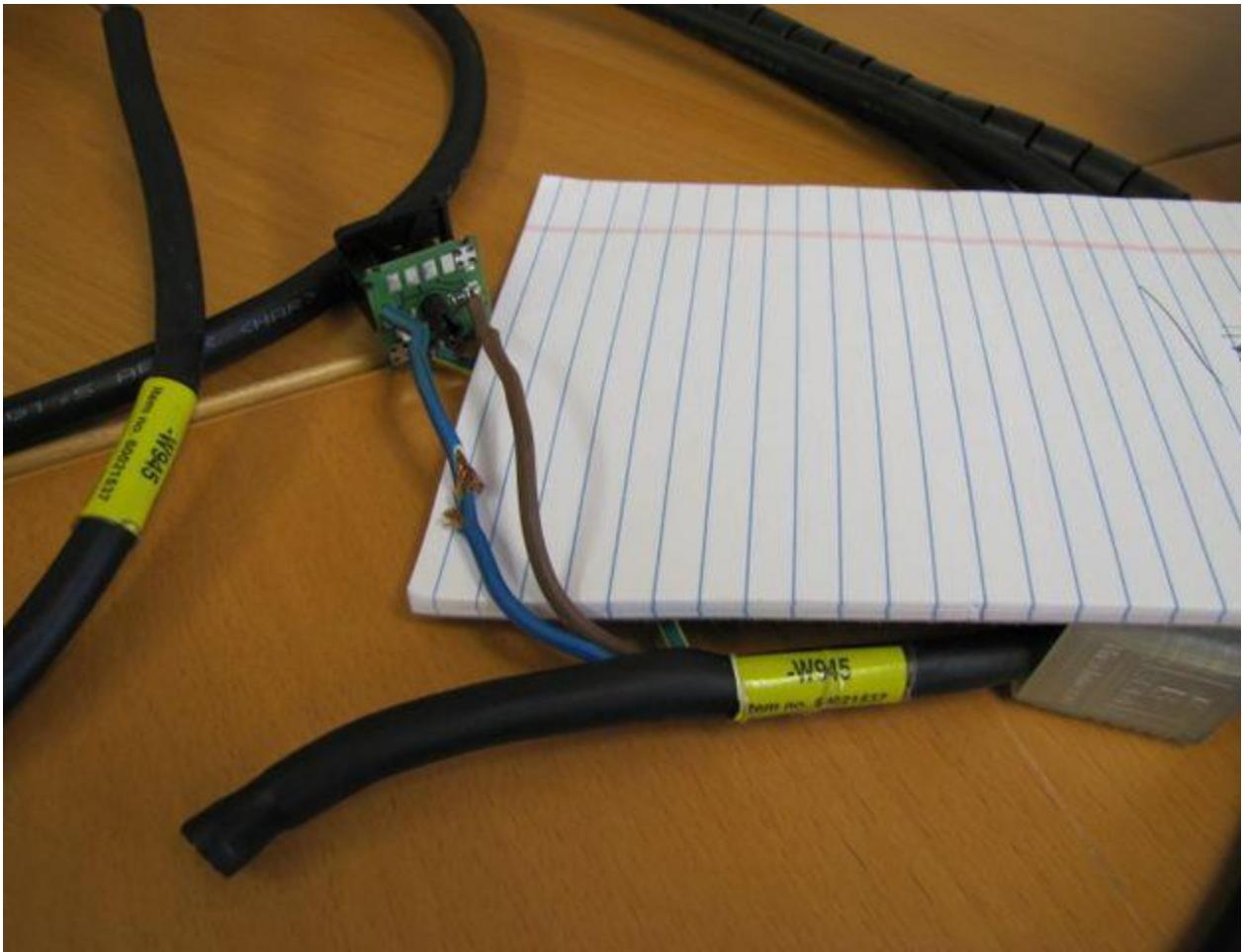
While pitching pull on the wire harness for the defective blade's proportional and solenoid valves (205, 210 and 215) and Position Transducer.

During operation the offending blade "flutters" a bit as the wire flexes in the hub.

If it is broken badly enough you will hear the blade "hammer" as it faults.

If a data logger is armed you will see the blade position flutter.

If you are watching real time on the TAC it is usually in perfect unison with rotor revolution (1 flutter per revolution)



| Relevant spare parts | |
|--|--------------------------|
| Description | Item No. |
| Cable, shut down valve pos. 215 | 60021539 |
| Cable, prop. valve pos. 205 | 60021545 |
| Cable, parking valve pos. 210 | 60021538 |
| CABLE W923 1 Pos. transducer (Blade A) | 60101018 |
| CABLE W924 2 Pos. transducer (Blade B) | 60101148 |
| CABLE W925 3 Pos. transducer (Blade C) | 60101149 |

486 - Unbalanced Pitch - V82



Check and replace proportional valve

Does this solve the problem?

- [1] Yes
- [2] No

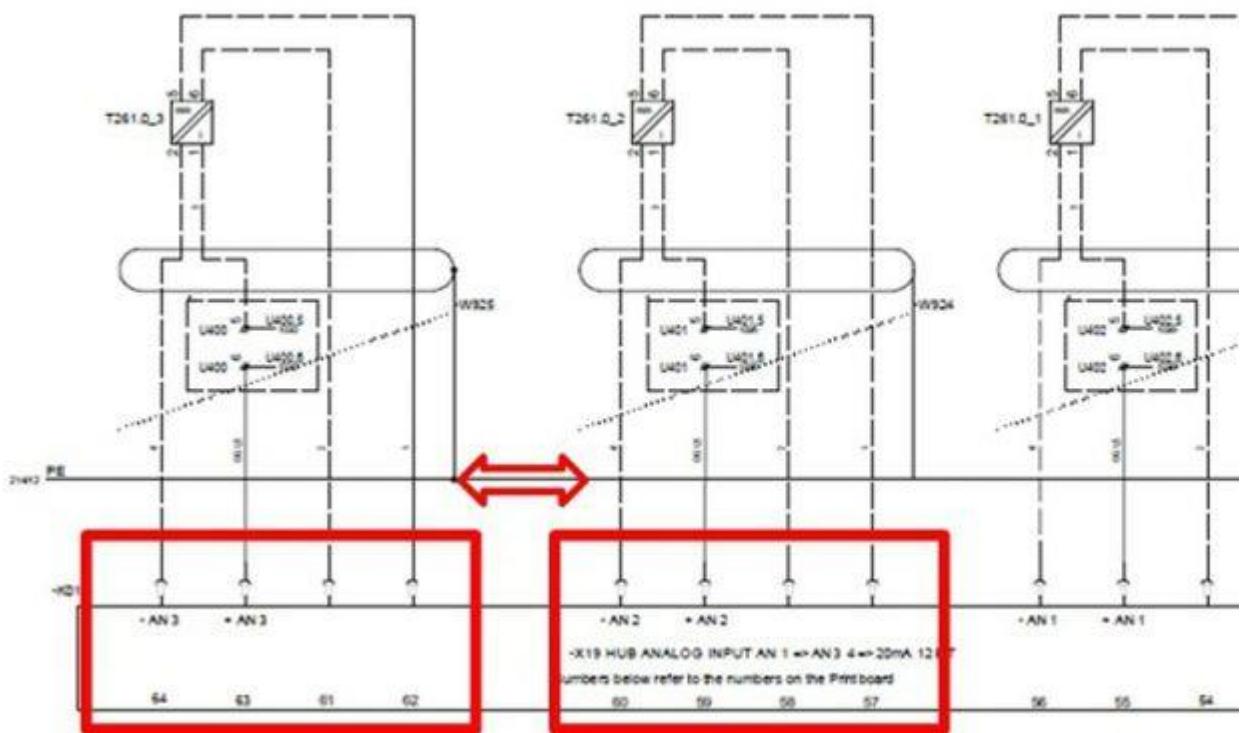
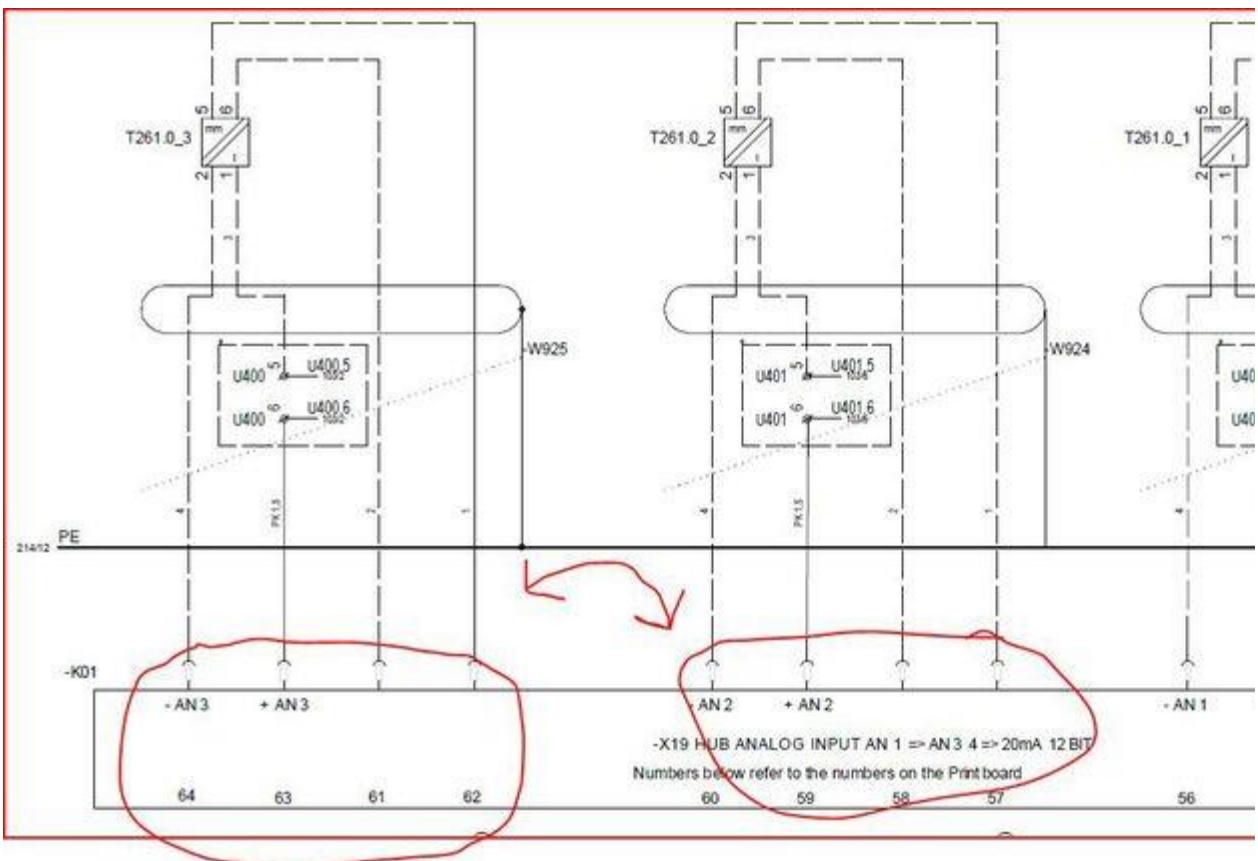
3] I don't know

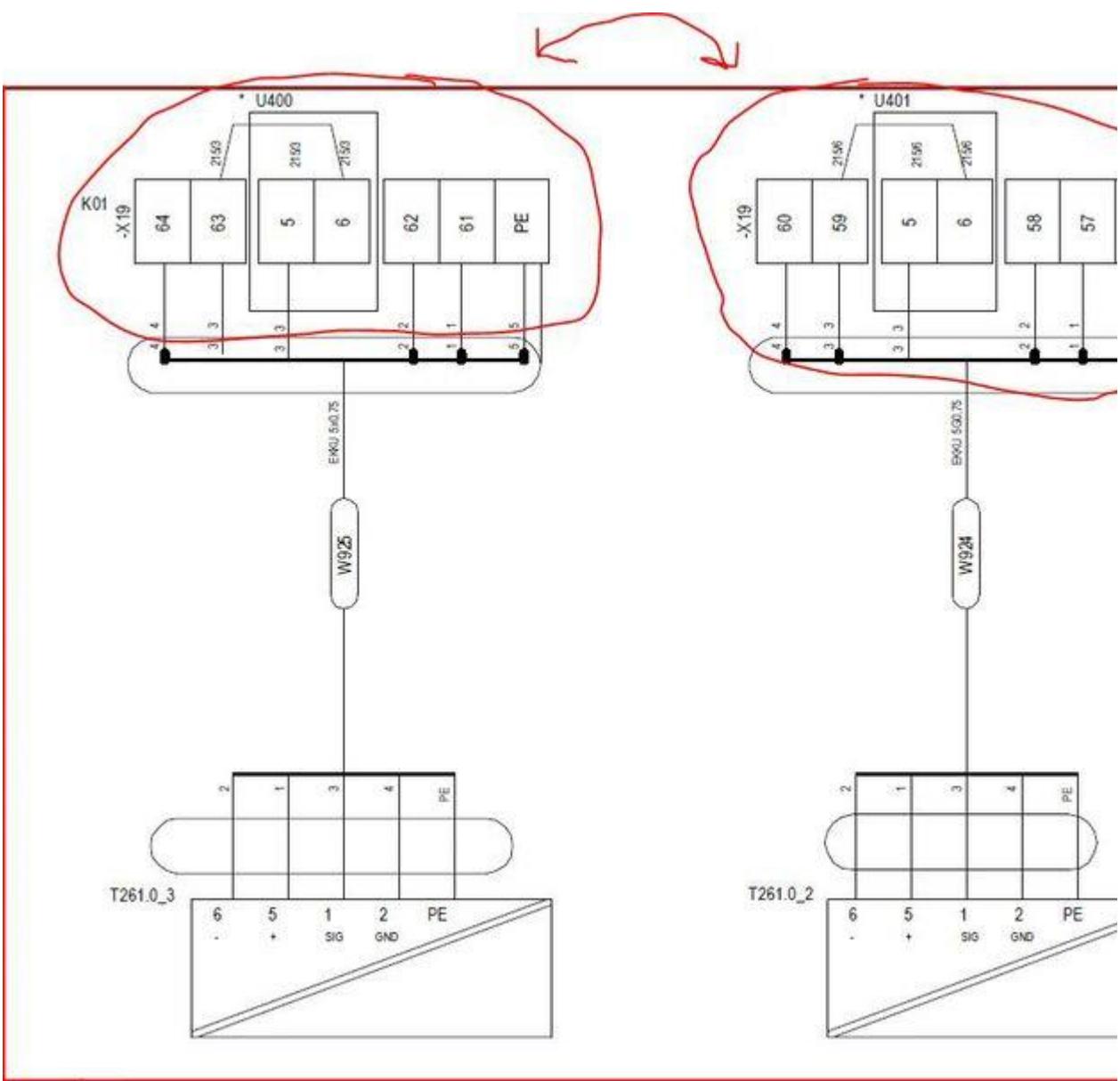
• [Explanation](#)

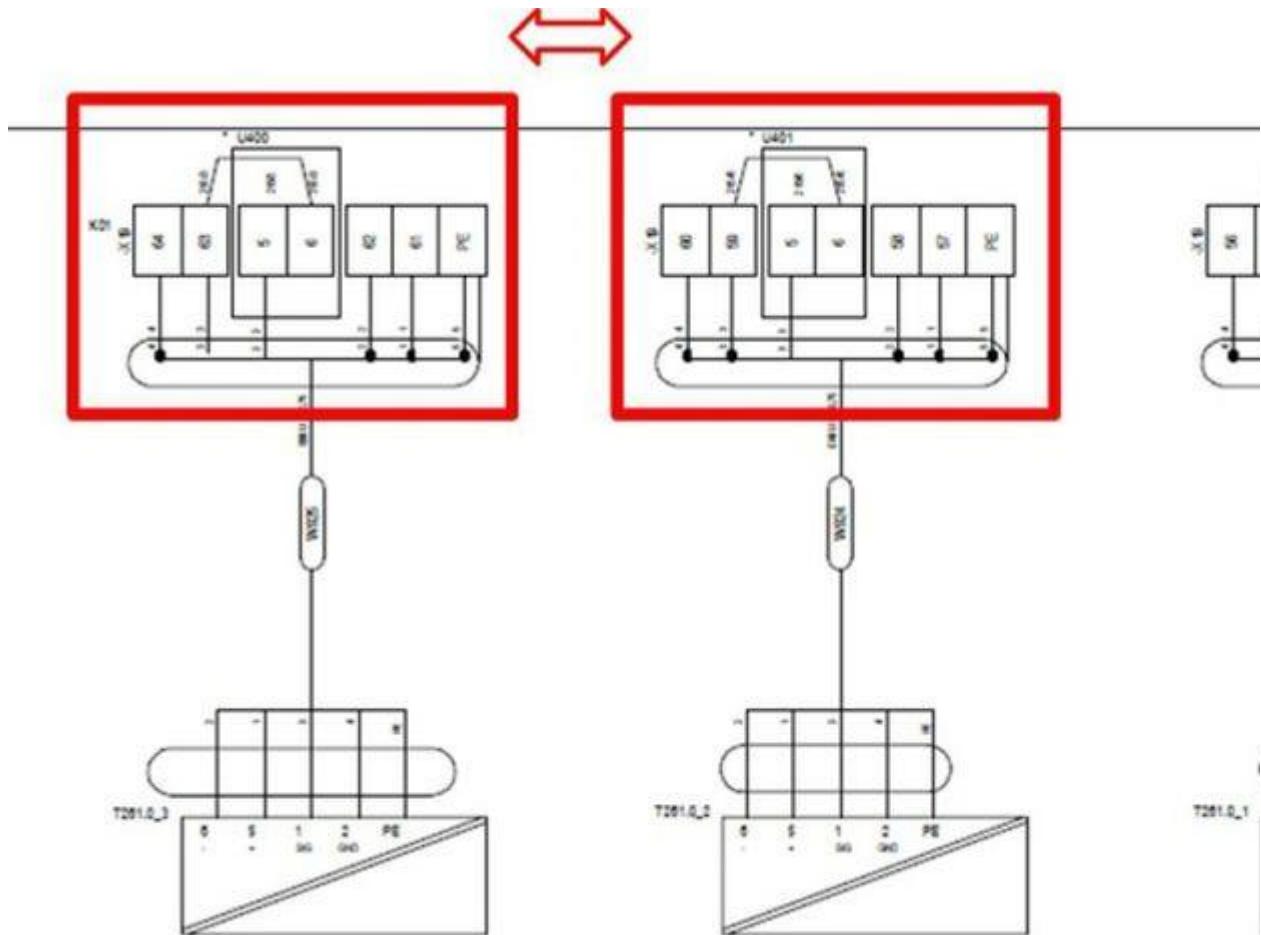
Check the proportional valve for any oil leakage and repair/replace the valve if leakage or loose components are found.



Swap the signal wire to the proportional valve and position transducer (Balluff) 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 B and C.







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.

The LED should be green with the pitch system pressurised.

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



Relevant task lists

| Description | Task list |
|---------------|-----------|
| Parker | 14333 |
| Bosch Rexroth | 14334 |

Relevant documentation

| Description | DMS No. |
|--------------------------------|---------------------------|
| Proportional Valve Replacement | 0016-1690 |

Relevant spare parts

| Description | Item No. |
|-------------|----------|
| | |

| | |
|---|----------|
| Parker - PROP. VALVE D31FHE01C | 60112621 |
| Bosch Rexroth - PROP VAL4WREE 10R75-2X/G24K31 | 60078979 |

486 - Unbalanced Pitch - V82



Manually grease blade bearing

Does this solve the problem?

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

● [Explanation](#)

Check the turbine alarm logs for occurrences of blade specific alarms e.g. 466 or 491 are specific to blade 1.

Run each blade individually from the hub.

During pitching observe any abnormalities turning the blade e.g. excessive noise from the bearing, other than smooth rotation of the bearing (jerking into run position and stop position), failure of bearing to move at a normal rate of speed.

If abnormalities are found, the bearing can be manually greased and operational tests performed once again.

| Relevant documentation | |
|---|-----------|
| Description | DMS No. |
| NM72/82-V82 Blade Bearing Manual Grease Procedure | 0024-9719 |

If the abnormalities remain, the bearing could be failed and replacement maybe necessary.

Flow-chart for trouble-shooting alarm 499

Error499 Troubleshooting Flowchart

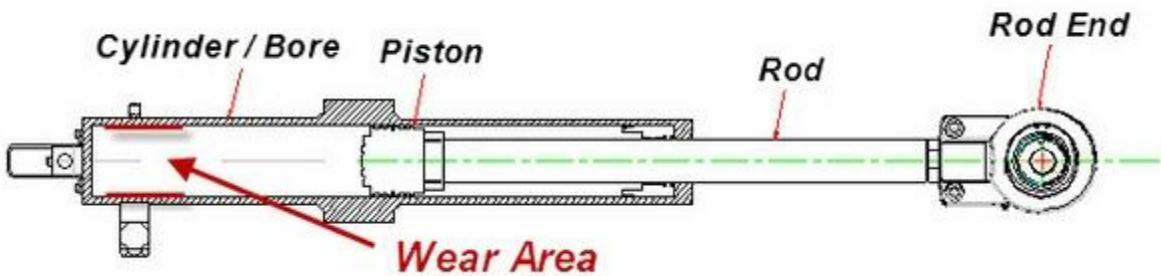


Perform a visual inspection of the back of the cylinder bore.

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 maybe 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 Hub Computer

Does this solve the problem?

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

• [Explanation](#)

Check channels 1, 2, and 3 in the Hub Calibration Menu. In a turbine with calibrated Position Transducer (Balluff) sensors the counts in these channels should be about 3800 when the blades are pitched to -95 degrees and about 900 when pitched to -0.5. If the blades are calibrated and the position transducers have already been verified to be working then seeing counts very different from these values is a sign that the hub computer is defective.

Faults on the Hub Computer can also be seen in other inputs. Also check the other inputs to the hub computer to see if they are displaying values that you would expect in a normal turbine. Faults on the Hub Computer can also be seen in other inputs.

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