

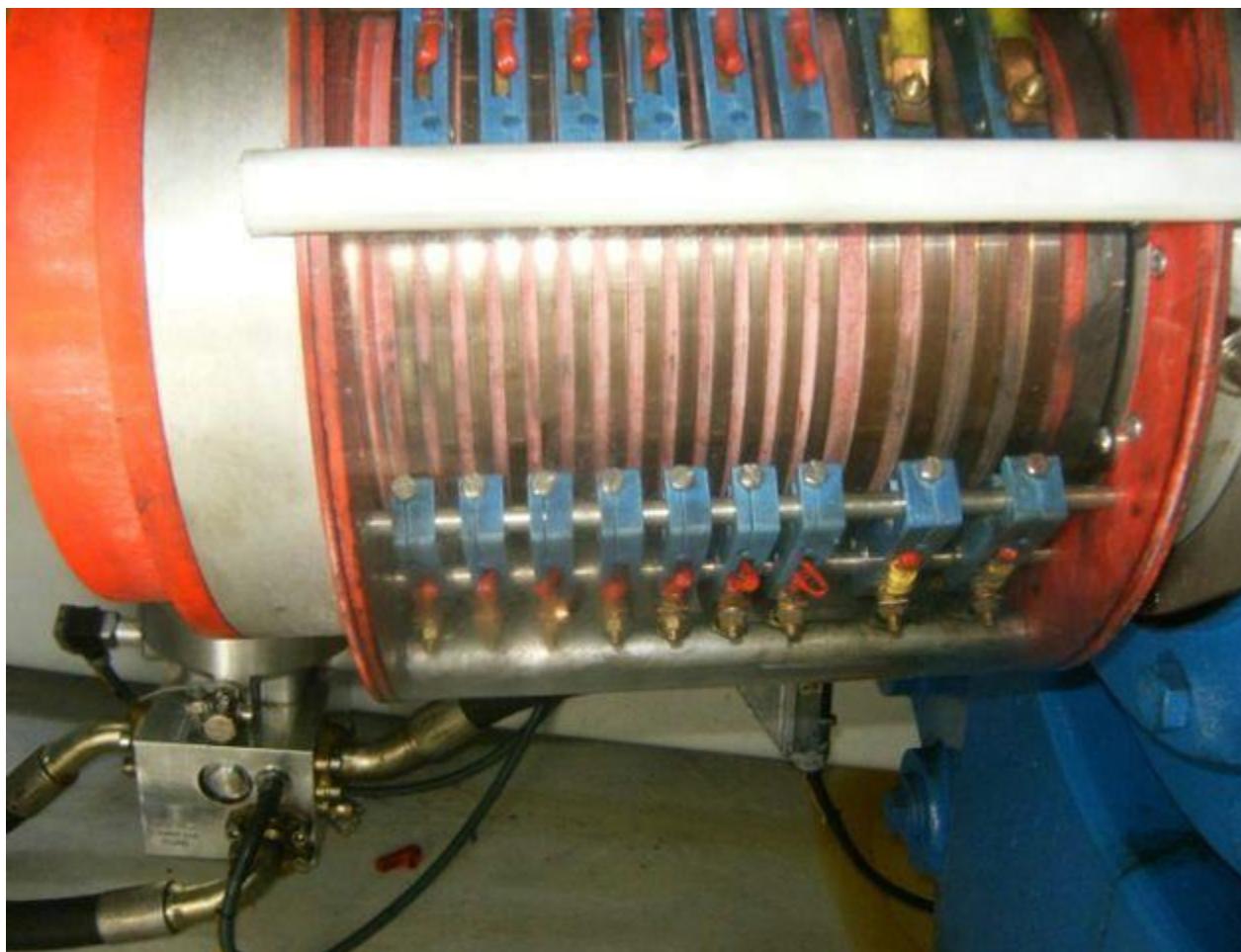
Clean or repair Slipring

Does this solve the problem?

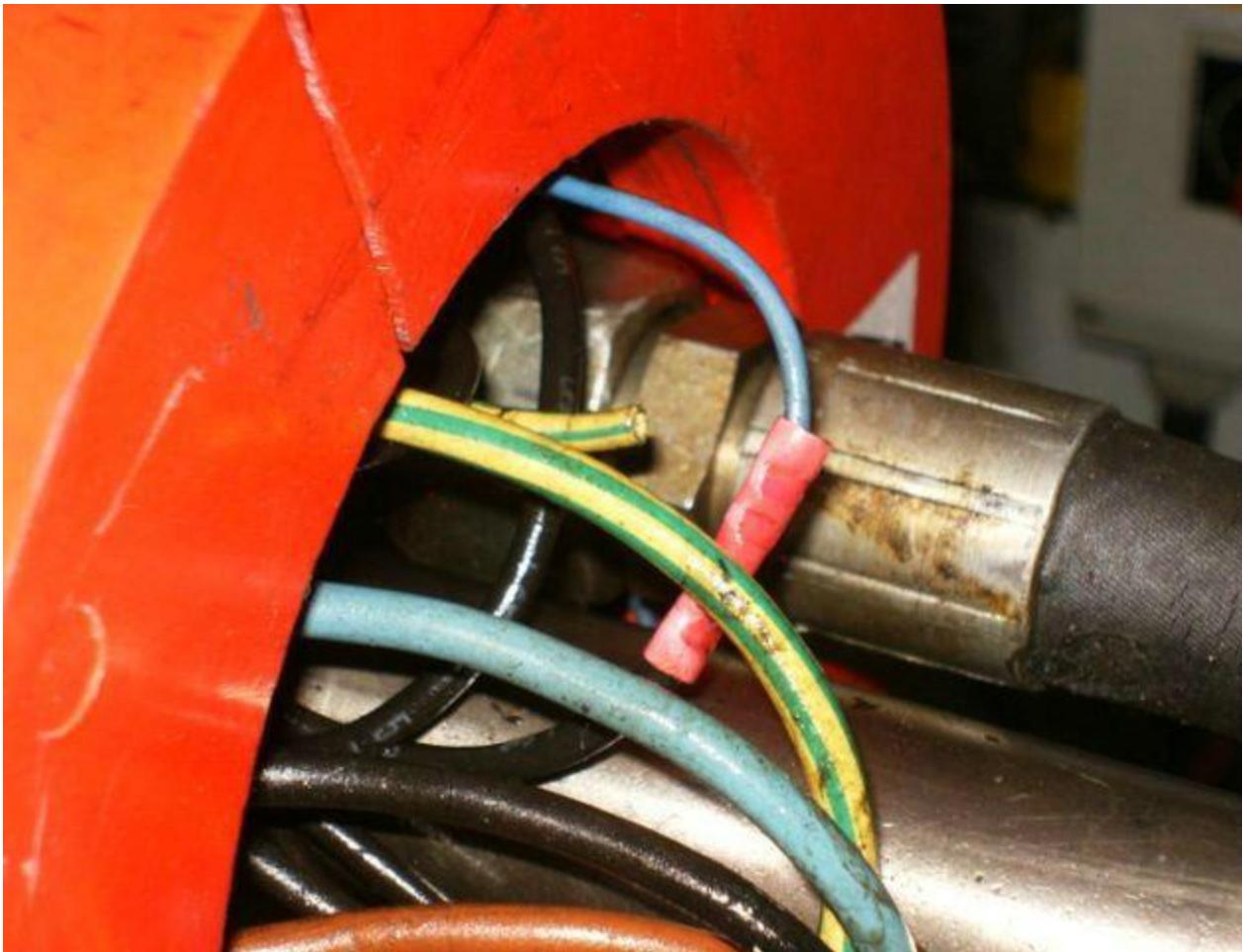
- 1] Yes
- 2] No
- 3] I don't know

- **Explanation**

Check the condition of the Slipring, paying special attention to condition of brushes.



Check that the grub screws on the Slipring are tight and that the torsional retainer is not damaged. Inspect that the cables have not been pulled tight around feeder pipes inside the Slipring.

**Relevant documentation**

Description	DMS No.
Cleaning Procedure for Slipring Unit, V82-1.65 MW	0001-4933

Use spare pin**Does this solve the problem?**

1] Yes

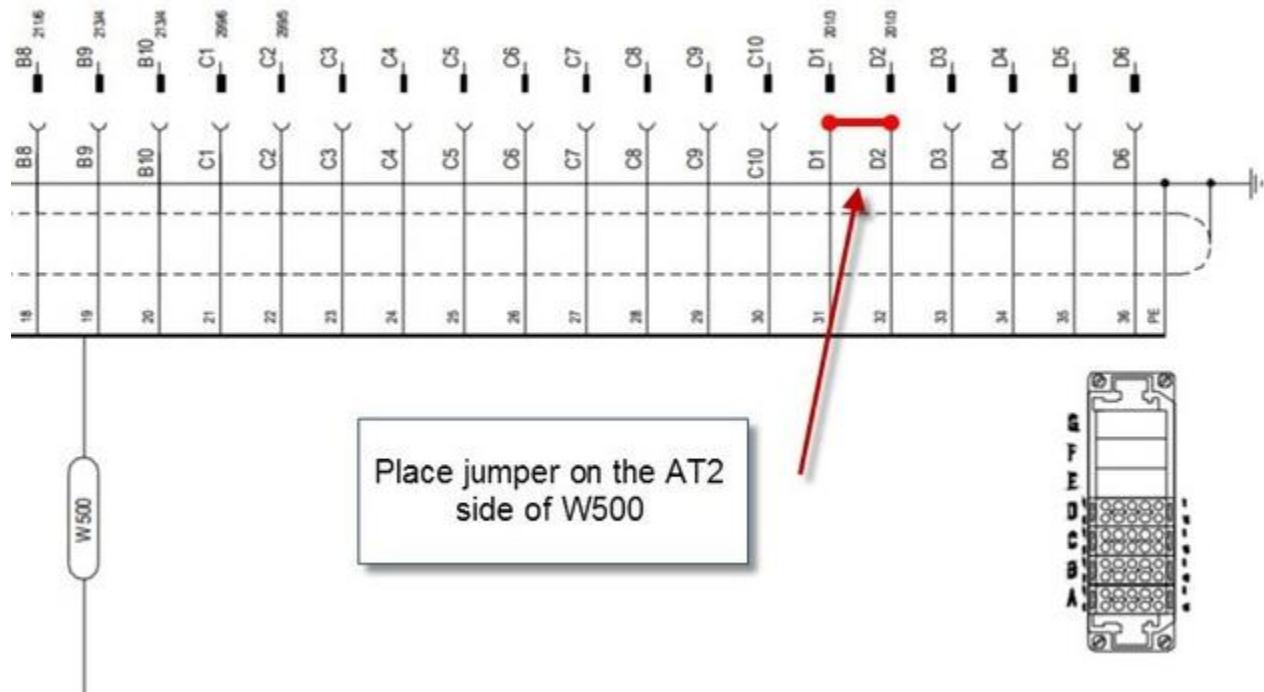
2] No

3] I don't know

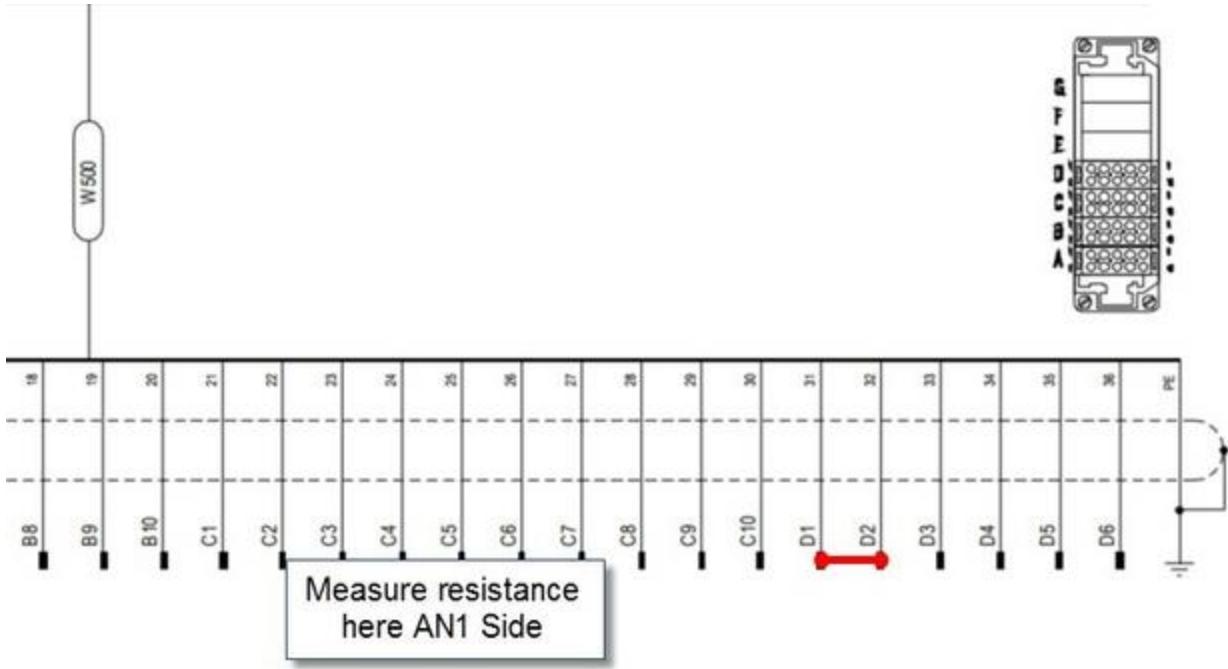
- **Explanation**

Individual wires in the W500 cable can fail. If this is the case, connect the safety line to one of the spare W500 wires.

To verify whether there is a break in a wire, connect a jumper to the AT2 end of the W500 cable at terminals D1 and D2



Measure resistance across pins D1 and D2 of the W500 on the AN1 side. Resistance should be small. If high resistance is measured, either wire 31 or 32 is broken. Use two of the spare wires (23-30 or 33-36) to bypass the break.



Replace the defective components

Does this solve the problem?

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

- **Explanation**
IN THE HUB:

Check any loose connection and damage in the varistor fixed on G401 and replace if required



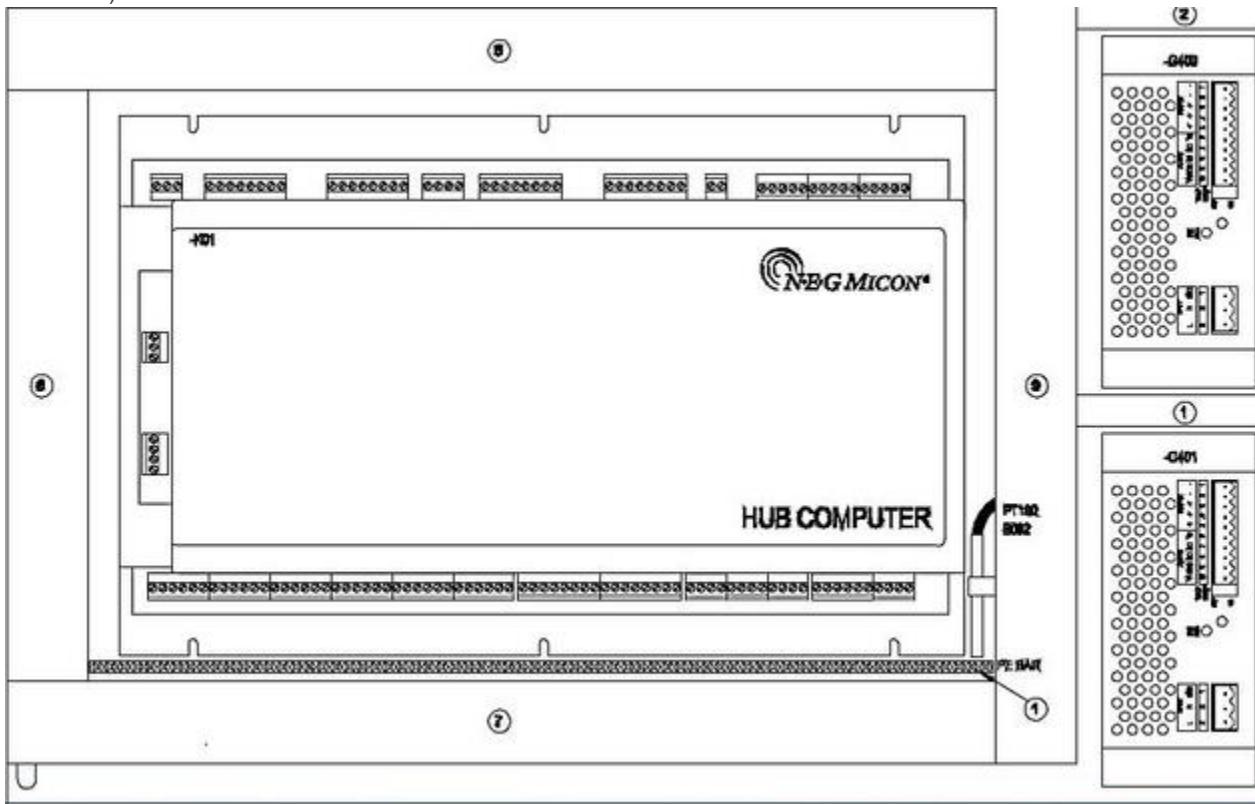
Check for the surge protector upgrade in Power Net as per Doc 0013-3681 or 0033-3872.

Relevant Documentation	
Description	DMS No.
Test Proj Adnl Elec Prot V82	0013-3681
Test Proj Add Elec Prot V82	0033-3872

Check for any loose connections at the power net (Pos: G401)
Check the input and output voltage 230/115VAC => 24VDC
Replace the power net if it is defective.

Power supply G401 supplies the shutdown and parking valves (215 & 210) for each of the three blades and is the most common cause for this fault.

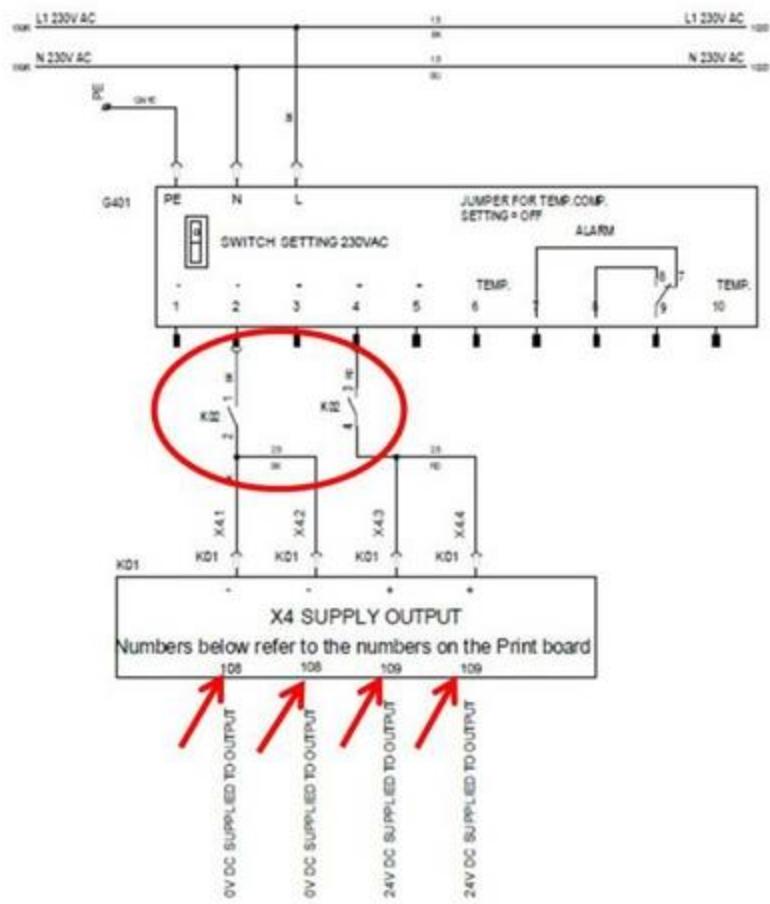
Test the output voltage to the valves at the power supply for 24VDC. If the voltage is good, test down the circuit until reaching the valves (failing valve solenoids or shorts in the circuit/plug/cables can drag down the voltage and cause this alarm).





Check the AK4:K02 is in the proper state, replace if it is damaged

It is fairly common for foreign objects to wedge the AK4:K02 closed. It is in a rotating part of the turbine and remains in one state for extended periods. If the K02 doesn't fully open when unpowered, it needs to be replaced.



X4 SUPPLY OUTPUT
Numbers below refer to the numbers on the Print board

108 108 109 109
0V DC SUPPLIED TO OUTPUT
0V DC SUPPLIED TO OUTPUT
24V DC SUPPLIED TO OUTPUT
24V DC SUPPLIED TO OUTPUT



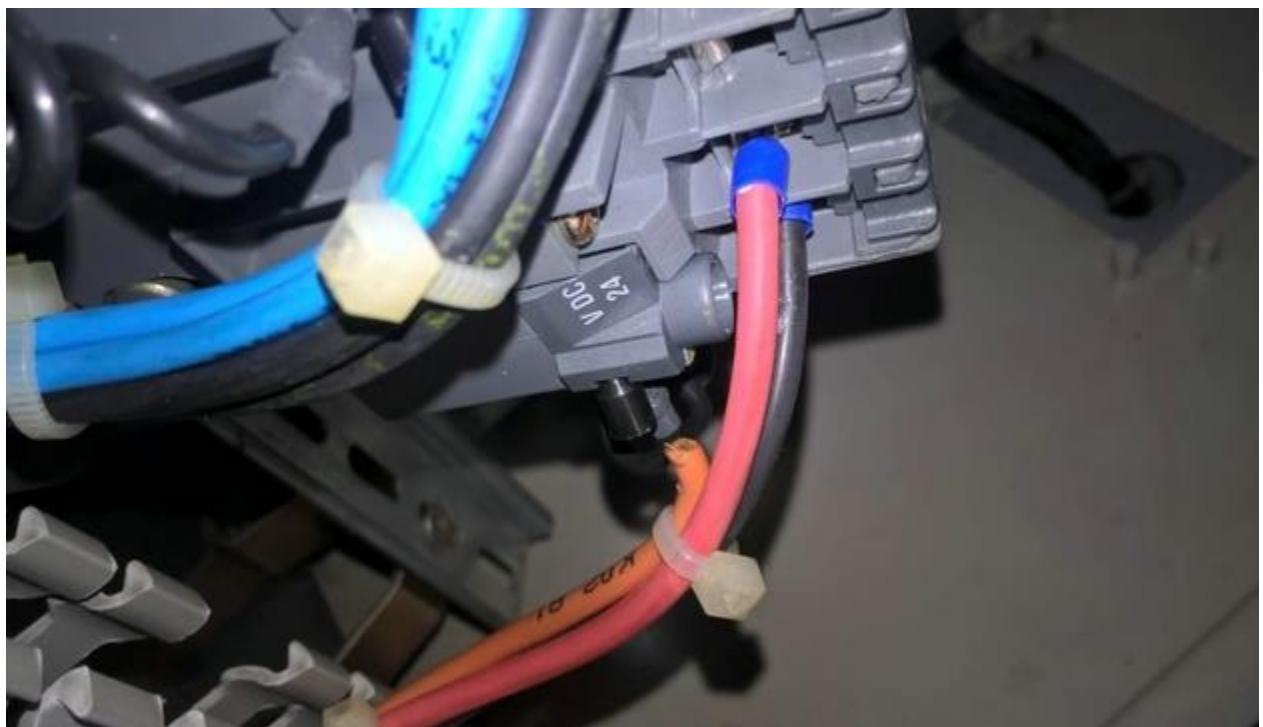
Relevant spare parts

Description	Item No.
PS ADC 5483R-3 10A-27,4 NM PIN (New type)	188453
VDR SIOV-S20K275 275V (Old type)	60000613

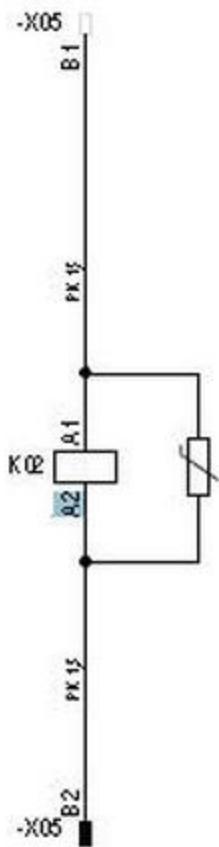
Relevant CIM case

CIM case	Information from CIM case
1390	Item no 60000719 at local stocks must be scraped and replaced with 188453

Alarm was detected due to a loose contactor (K02) power supply connection (A2) in +AK4 hub computer panel :



From drawing 6015908



Relevant spare parts	
Description	Item No.
CONTACTOR BC9-30-10 24VDC (Discontinue)	60004322
CONT AL 9-30-10 24V DC (Serial Production)	60110379

Relevant Documentation	
Description	DMS No.
V82-1.65MW 1-Speed 690V 50Hz Standard, Tropical, Tropical-20 deg. C & Arctic MK III	22000560
HUB CPU PANEL+AK4 RAL7035 V82-1.65MW	6015908

Replace the defective safety relay

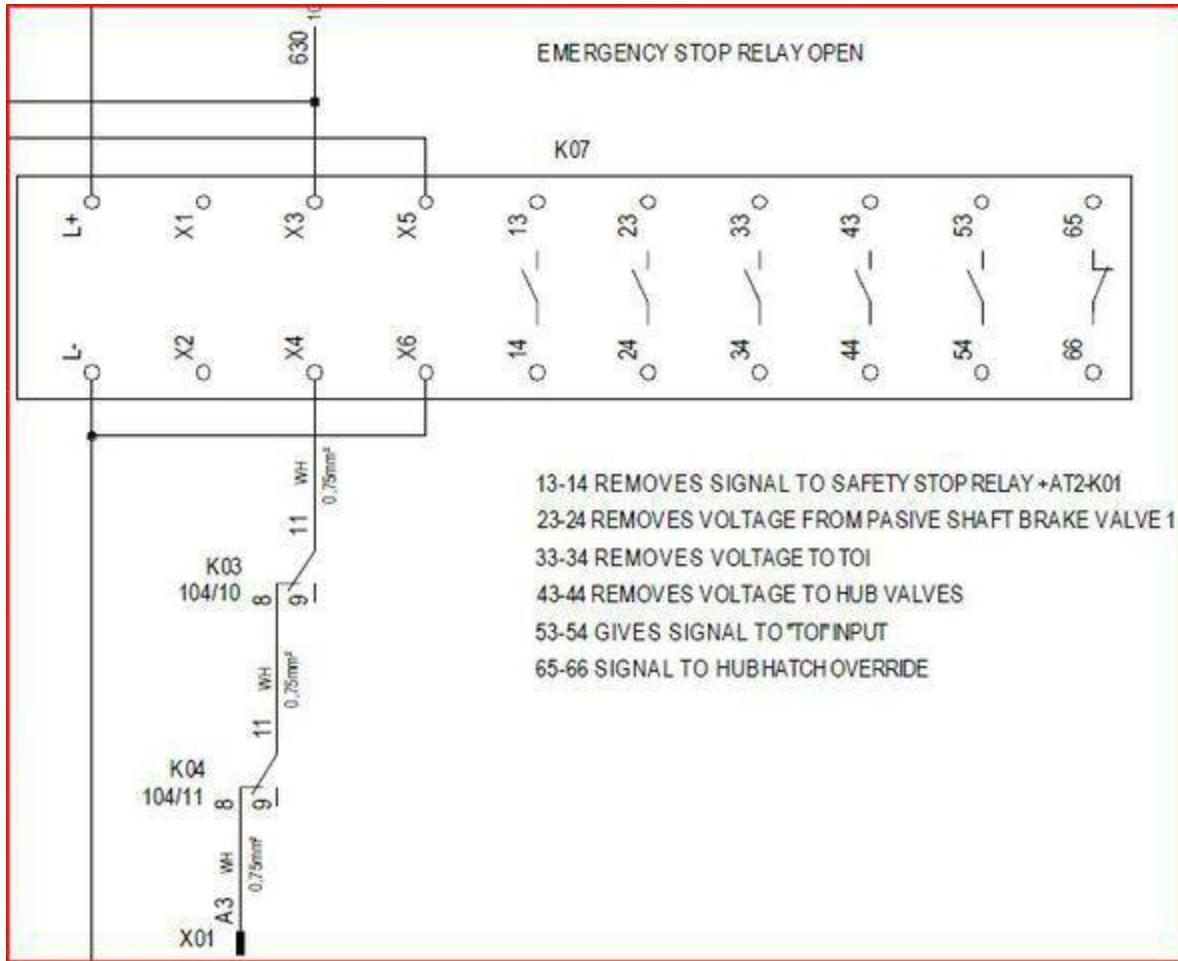
Does this solve the problem?

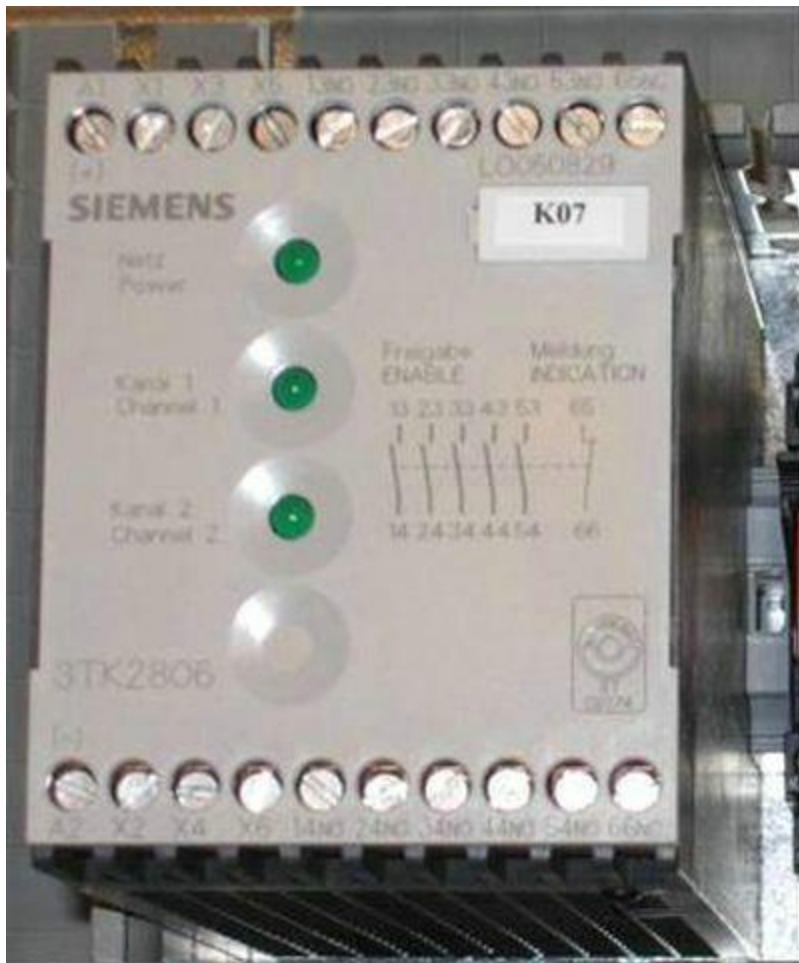
- 1] Yes
- 2] No
- 3] I don't know

- **Explanation**

SAFETY RELAY (K07) – IN THE +AN1 PANEL:

The Emergency Safety Relay in the AN1 panel stops the power to the hub valves at terminals 43-44, so check the continuity across the terminal and replace the relay, if continuity is missing.





Relevant spare parts	
Description	Item No.
RELAY SAFETY 3TK2806-OBB4 24VDC 5NO+1NC	60004996

Inspect and replace plugs or wires as needed

Does this solve the problem?

1] Yes

2] No

3] I don't know

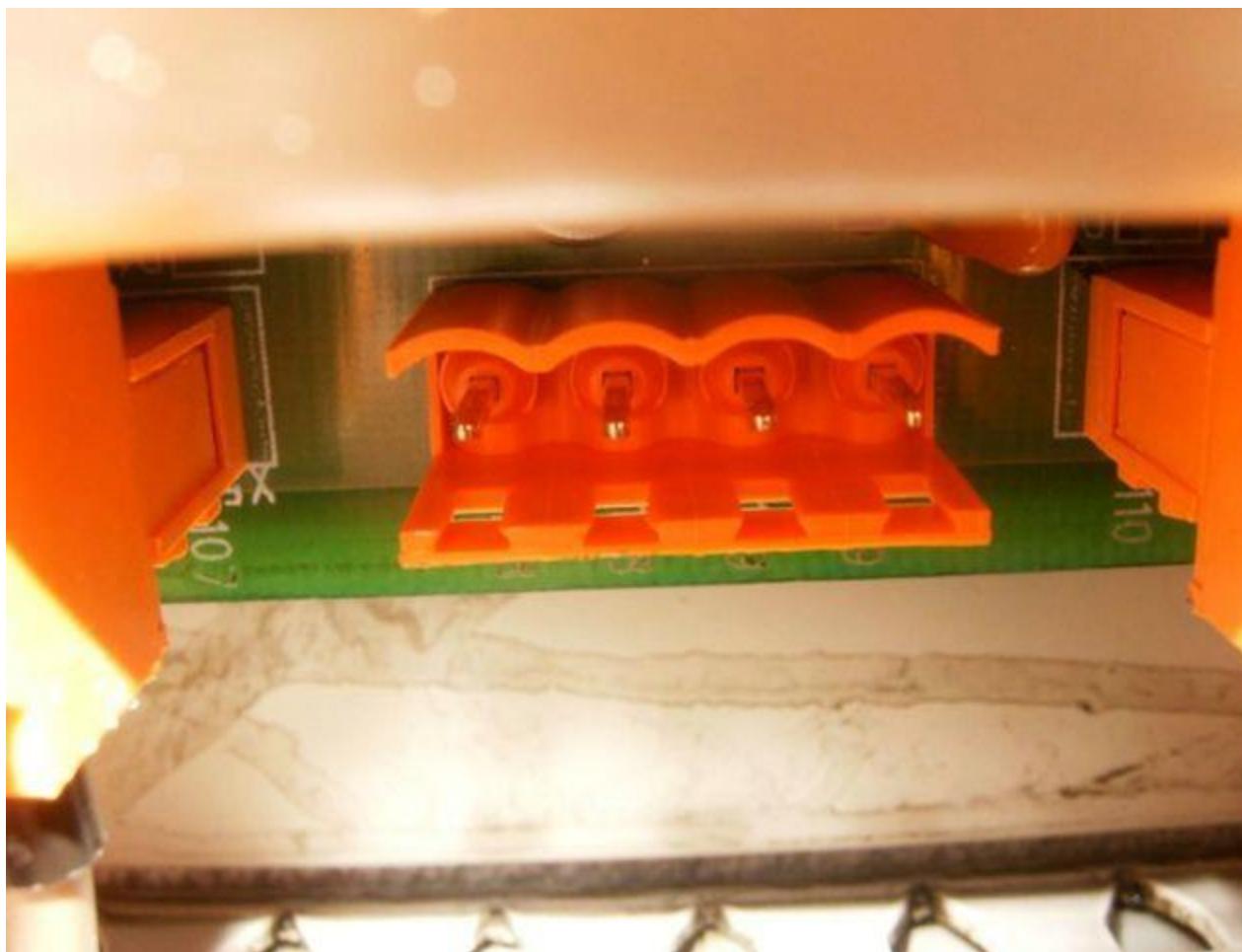
- **Explanation**

24VDC is supplied from the G401 power supply through the hub computer. The hub computer controls power to the valves during normal operation. Inspect the plugs from G401 and G401 to the hub computer for loose connections or burnt or discolored/corroded terminals. If there is oil or moisture intrusion into the hub panel, connectors can become contaminated and a poor electrical connection can result.

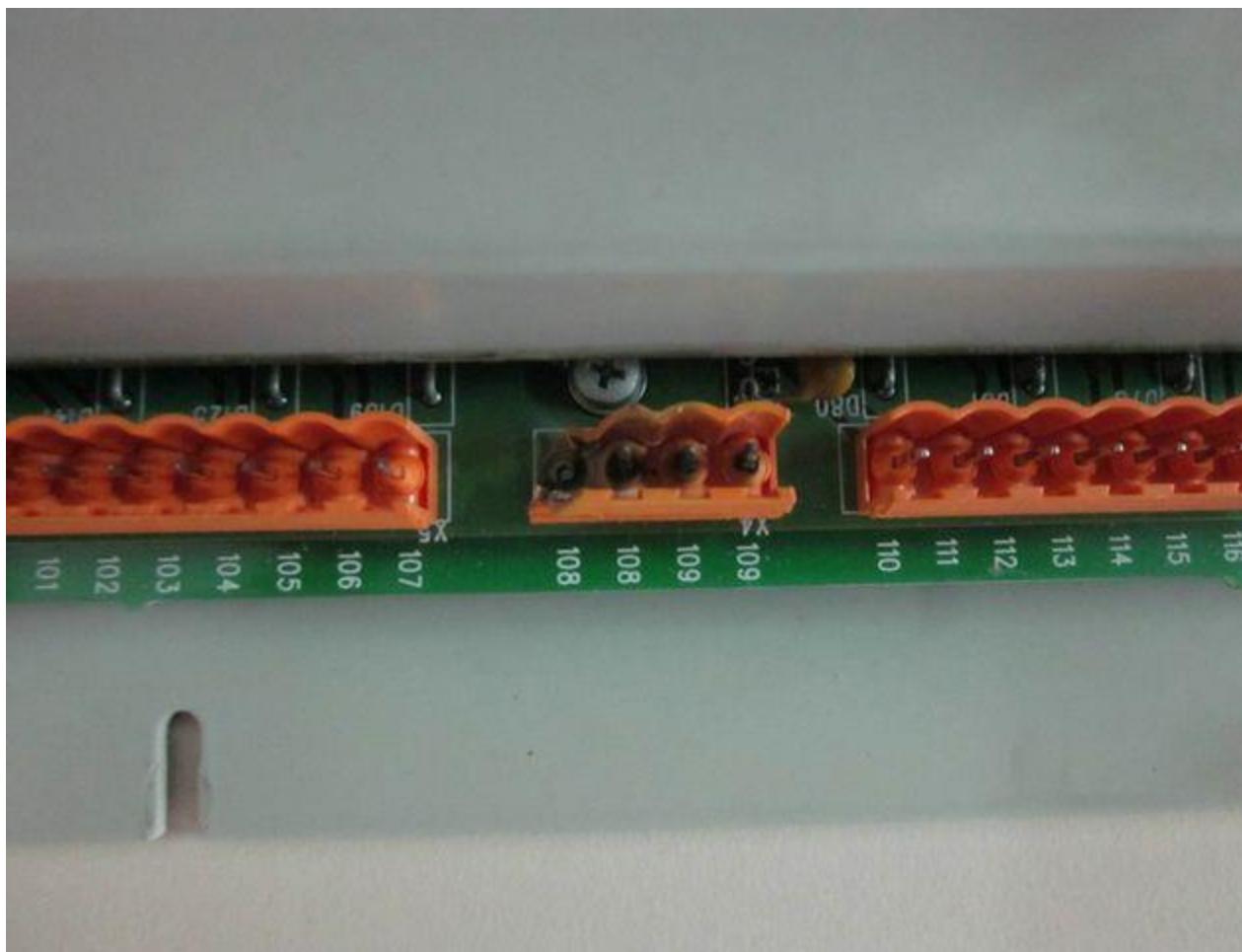
Power supply G401- 24V burnt plug:



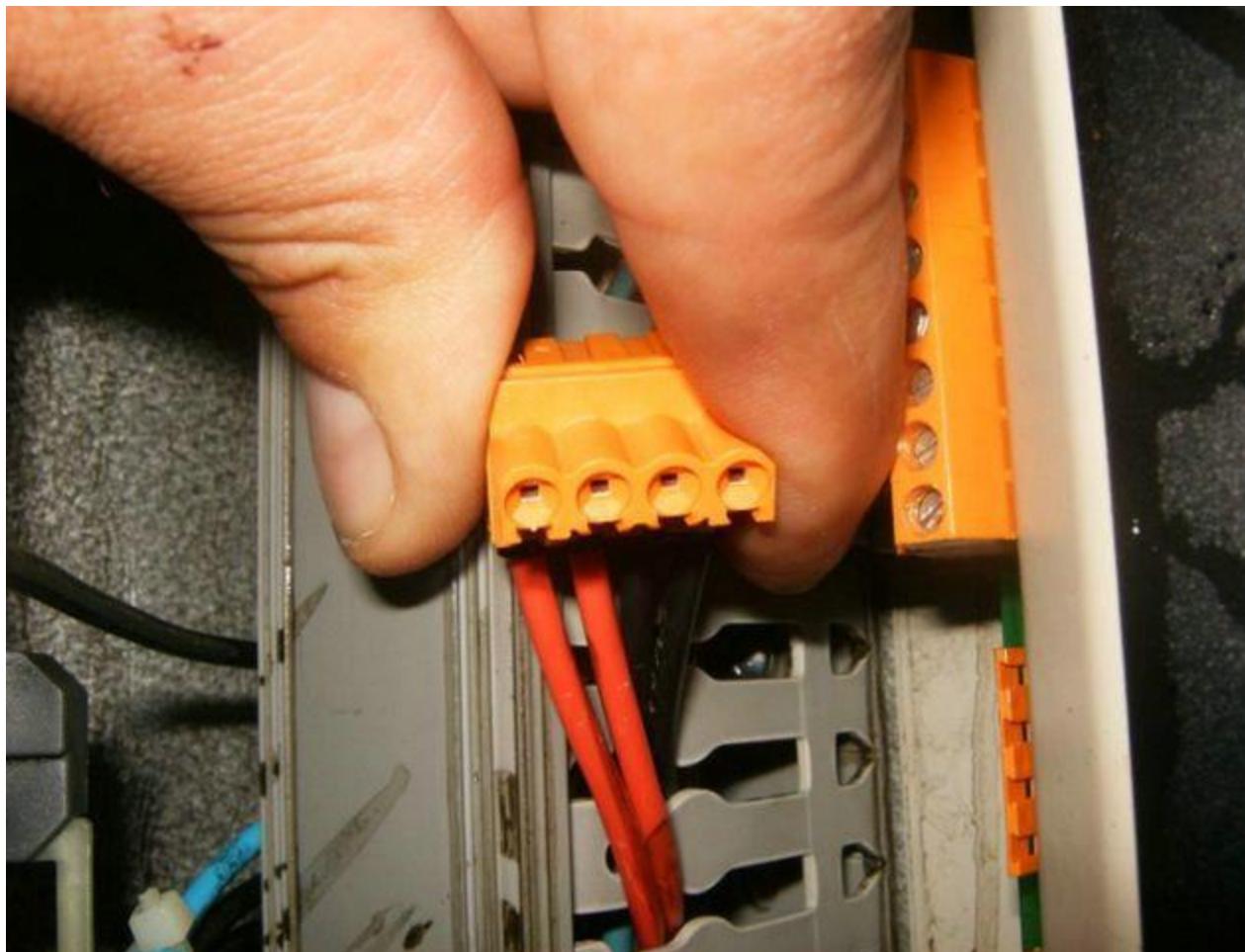
Male pin 108 and 109 on the hub computer PCB.



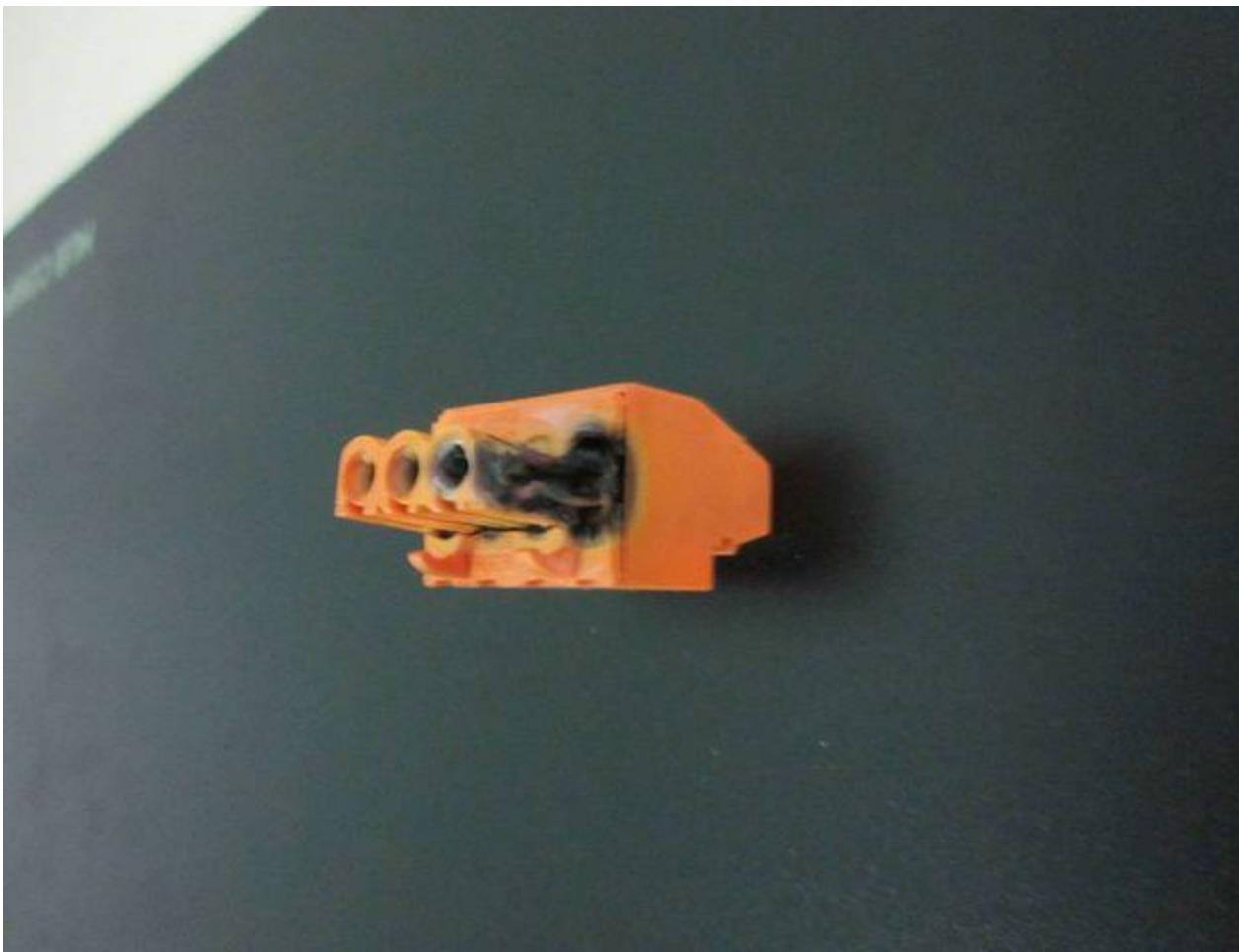
Burned pins:



Female plug 108 and 109



Burned plug:



New connectors item number: 60001930



"Supply to Hub Valves" goes through the Safety line and the safety stop relay K01 (50Hz) or K23 (60Hz) (terminals 43-44) located in +AT2 (Control panel).

Cables have to be checked for continuity in the multi cable W500: cable 31-32 (this cable connects +AT2 and +AN1 Top panel), since they can break (most probably around the loop where the stress is highest). W500 have many spare cables which can be used, (remember to mark the change/defect cables in both ends).

Relevant spare parts	
Description	Item No.
CONN BLZ F 4 LEADED	60001930
CONN MVSTBW 10 LEADED	60001890

Note:

Be aware of different drawing for older MK1-2 turbines and that some (like Las Lomas in Spain) have been upgraded to MK2-3 diagrams for the safety line:

Relevant documentation (50Hz)	
Description	DMS No.
INDEX, NM72-82/1650 690V 50Hz STANDARD (MK1-2)	<u>22000174</u>
INDEX, V82-1.65MW & NM72/1650KW 1-SPEED 690V 50Hz (MK2-3)	<u>22000225</u>
INDEX, NM72-V82 2-SPEED 690V 50Hz (MK2-3)	<u>22000227</u>

Check the condition of the -W980 cable in the hub.

Check for any cracks or wear on the cable.

Replace the cable if it is defective.



Perform a continuity check on the -W980 cable:

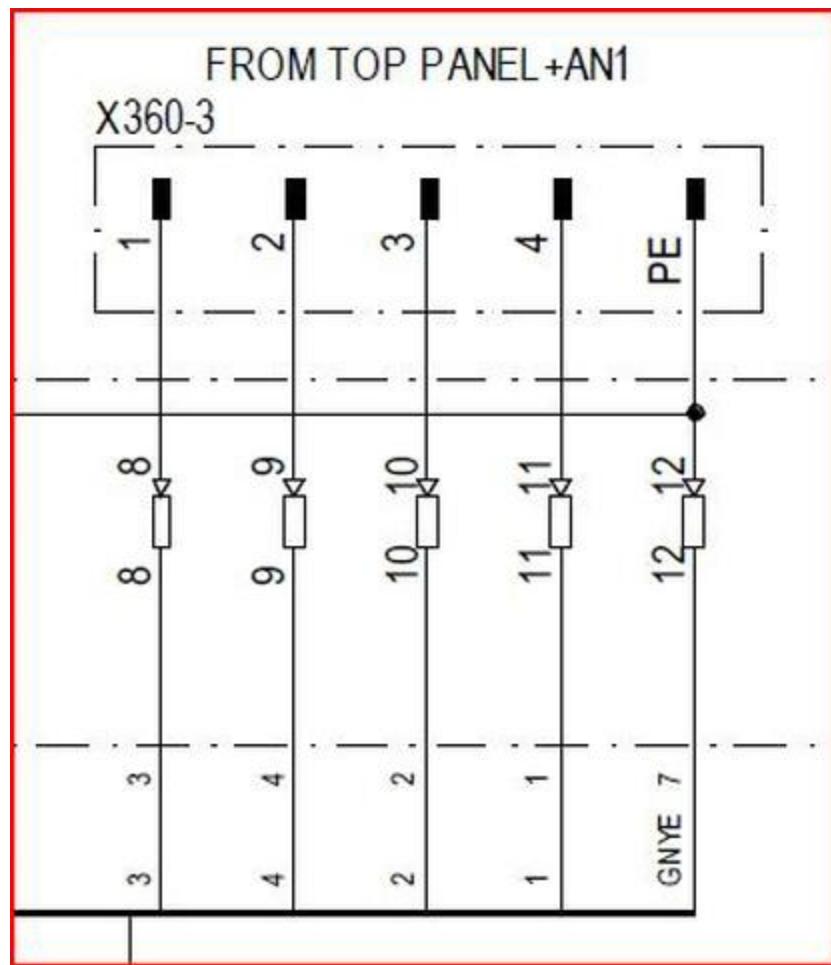
WARNING: Ensure that proper LOTO procedures have been followed and no voltage is present on the 230VAC circuit before testing the cable.

On the W980 cable place a jumper between Pins 1 & 2 in module A.



IN THE NACELLE:

Remove the -X360-3 plug from the slip ring.





With a multimeter set to read Ω , measure between pins 1 & 2.

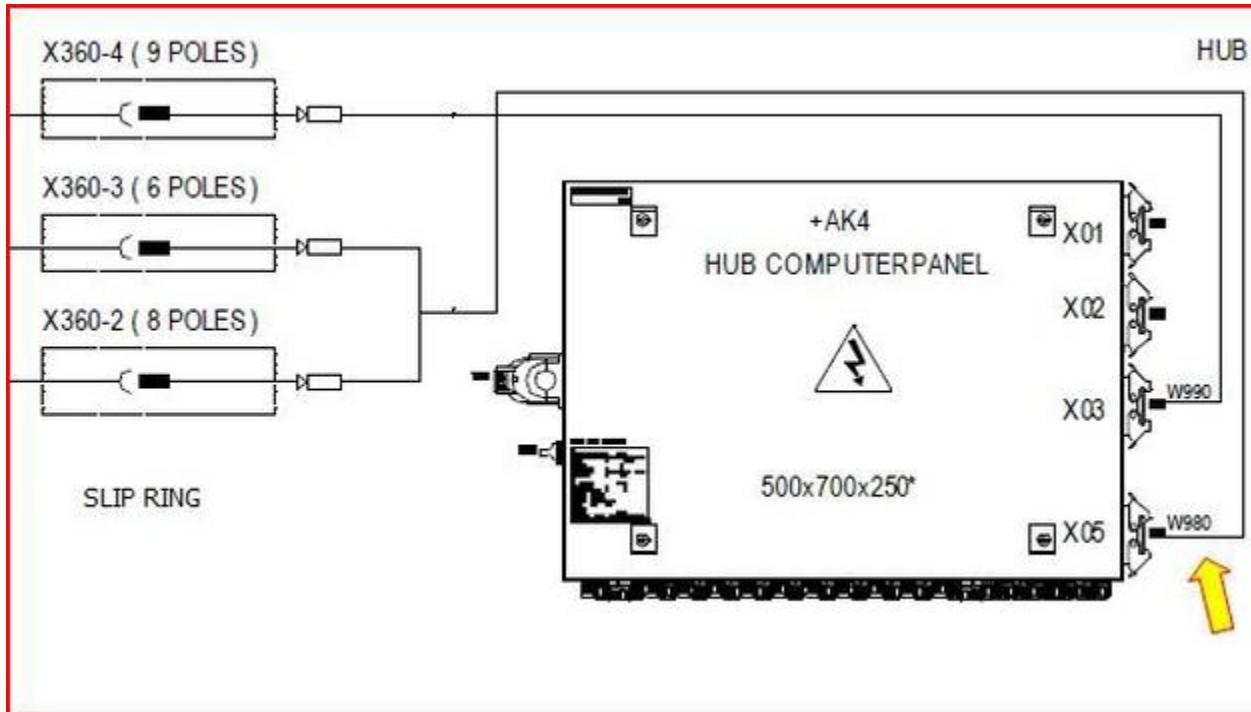


With the jumper in the hub, there should be a very low resistance value read by the meter.

Perform continuity checks on the -W360-3 and -W360-4 cables between the slip ring to AN1 cabinet. Replace any defective cables found.

Relevant spare parts

Description	Item No.
CABLE W980 IEC Supply	60021557



Replace the defective hub computer

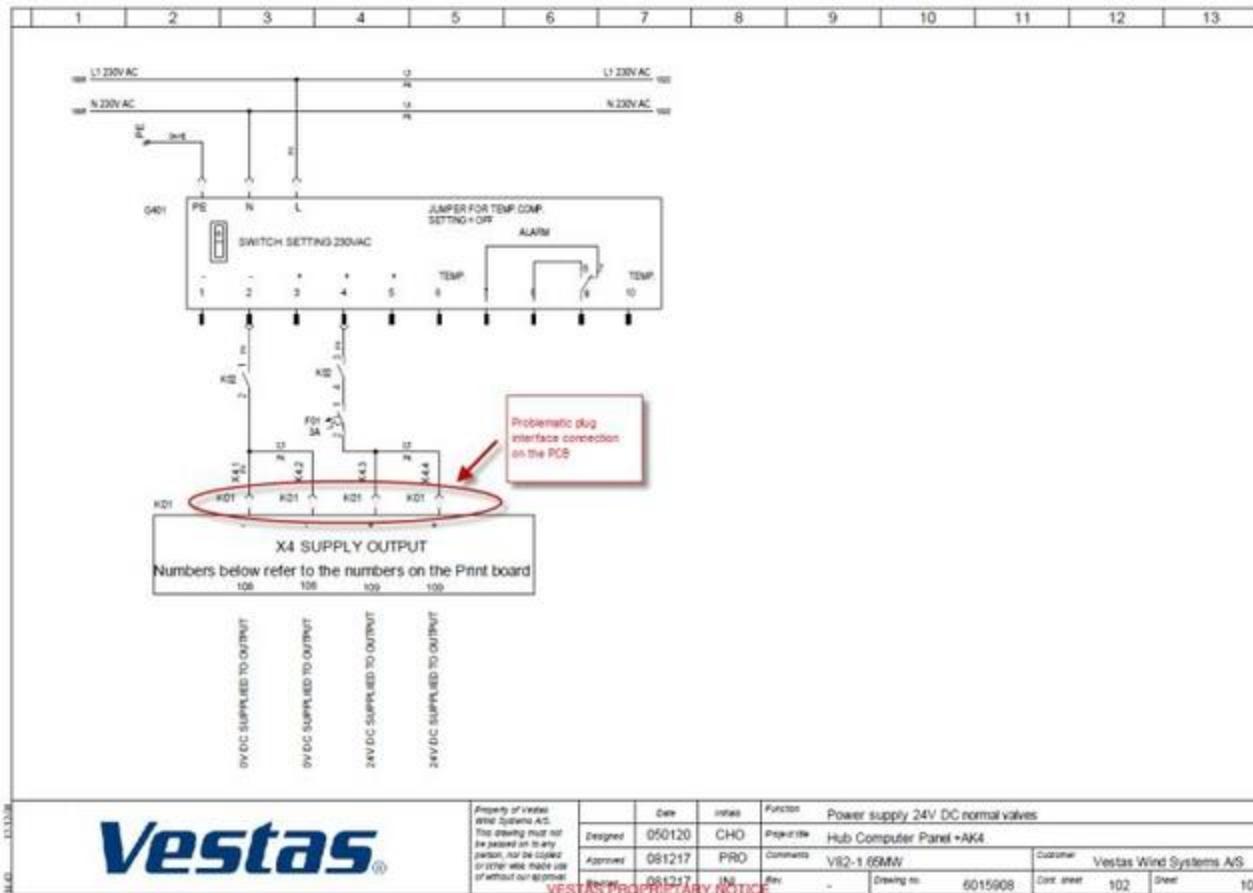
Does this solve the problem?

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

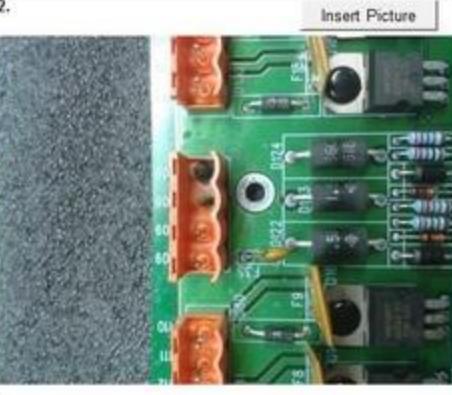
- **Explanation**
IN THE HUB:

Check 24V DC Power supply plug

The problem is relating to the X4 plug connection where the 24VDC is supplied to the HUB Controller.



It has in many cases been seen that the plug connection have been overheated and burned as indicated on the below pictures.

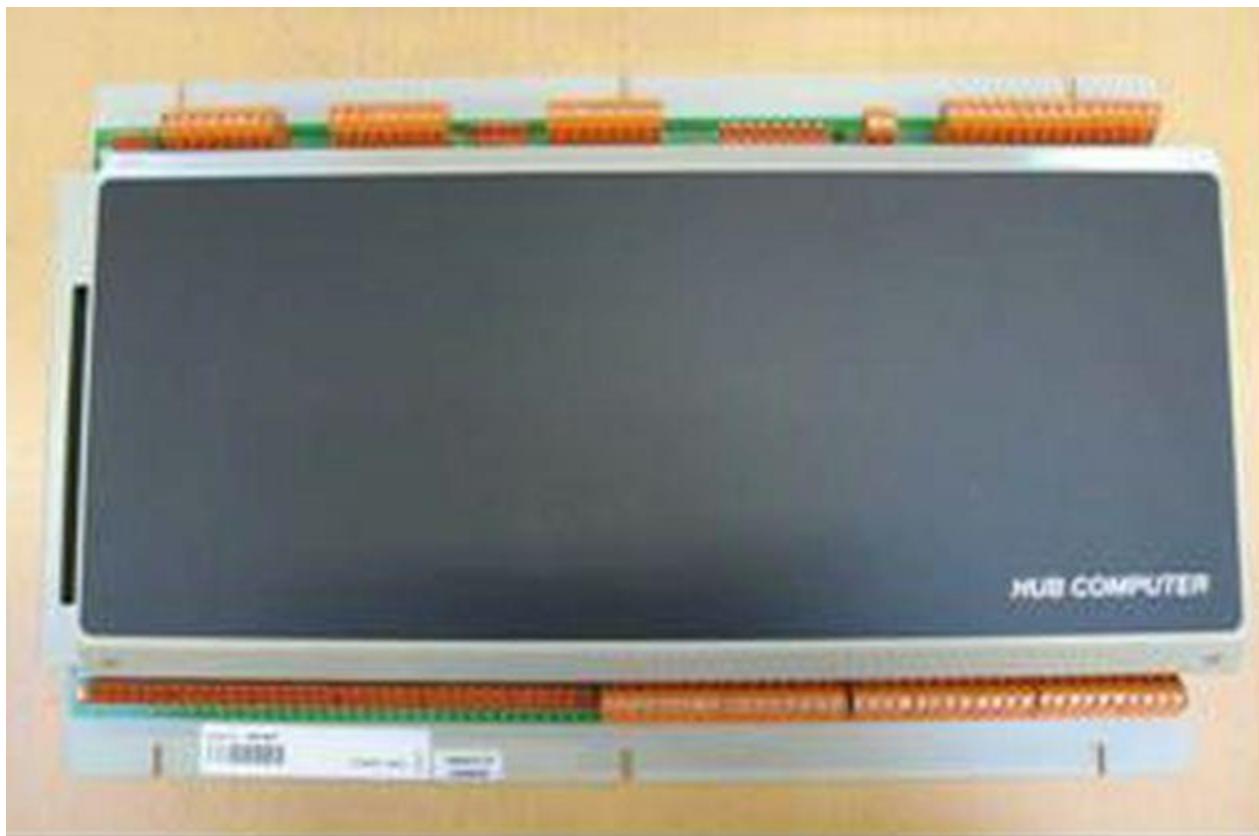
	
Picture 1 Hub computer shows burnt 108/109 connectors	Picture 2 Hub computer shows burnt 108/109 connectors
	
Picture 3 Hub computer shows burnt 108/109 connectors	Picture 4 Hub computer shows burnt 108/109 connectors

If the hub valve supply voltage is present to the hub computer, but there is not sufficient output to the valves, it is likely a faulty hub computer causing the issue.

Replace the hub computer if it is found to be defective.

Relevant spare parts

Description	Item No.
SIF HUB COMPUTER CABINET EVOII	<u>51701801</u>



Relevant CIM case		
CIM case	Task list	SWI
<u>1594</u>	12511	

<u>1344</u>		
<u>3410</u>		

Check for the surge protector upgrade in the power net as per document:

Relevant documentation	
Description	DMS No.
0013-3681_Test Proj_Adnl Elec Prot_V82	<u>0013-3681</u>
Add_Elec_Protec_V82	<u>0033-3872</u>