ANODE ROTATION SAFETY

Whenever you get error 133 the error is sensed on High Speed Starter assembly. The error is the OR of two different error sensed directly on HSS boards:

There are two different error and each one is coded as a RED LED lit on 5847 board (the Controller)

There is a label on the assembly explaining the error sensed:

DL24 is NO ROTATION DETECT
DL25 is SHORT CIRCUIT DETECT

DL24 displays the status of the current flowing through the windings
DL25 displays the status of the current flowing through the power bridge

**DL24**

DL24 is lit when no current is sensed across the windings:
The green part of the circuit senses the presence of alternate voltage across the windings.
The Yellow part senses the current flowing in either MAIN-COMMON and SHIFT-COMMON windings.
The rose part sends the information to the on-board microcontroller, in case the optocoupler is not ON when the switching is ON, DL24 is lit and error 133 is sent to the main computer.

**INJ THIS CASE:**
Check that the fuses on Safety Supervisor Board (R306.3x) or mounted over line electrolytic capacitors (R306.4x) are in the NON blown state.
Check that there is connection between the tube windings and the HSS power board.

**DL25**
DL25 is lit when the current flowing in the black sensor raises over 25A (the black and red cables which passes in the current sensor).

In this case there can be
- IGBT in SHORT CIRCUIT, this is easy to be checked:
Simply using an ohmmeter check the blue and the red connection, the resistance you’ll find is like a capacitance charging, in case of IGBT short circuit the resistance do not rise over 100Ohm

- ELECTRICAL NOISE – if it happens sometimes and most of the cases during High Speed Acceleration;

Be sure that a capacitor within 220pF to 0.1uF is mounted directly on the anodes of D9 and D10
- CABLE IN SHORT CIRCUIT: simply check with an Ohm-meter the three windings impedance according to data shown in tube datasheet, on HSS side after removing the pin
from the HSS power board, for example in Varian tube You’ll find 15 Ohm between Common and Main and 35 Ohm between Common and Shift;

- Check for insulation between inner and outer screen and in any case remove the inner screen connection to the negative supply and connect with the outer screen to ground to make further test.

Further tests:

DL24 means NON ROTATION DETECTED, i.e. the current sensing or the voltage sensing on the power pcb of the HSS is not sensing the correct current.

My question is: IS THE TUBE ROTATING?
In case it is rotating there can be a faulty readout, such as R3 or R4 opened (47kOhm) or simply a reed relay broken which is not closing in the magnetic field produced by the current flow.

IF tube is rotating, measure R3 and R4, then you can try shorting the reed relay as per picture below in orther to see if you can keep on working while a new HSS will be shipped:
IF THE TUBE IS NOT ROTATING:
1) Always check the integrity of the fuses that carries the 560Vdc to the HSS power board

2) this circuit drives the IGBT's gate, it should work when the proper voltage are applied to the gate's power supply through this circuit:
Gates power supply

In this case you can check on controller board with a voltmeter for the correct voltage on IGBT's gate.

(p.s. do not touch 'cause 560Vdc is applied to this circuit when OK key is pressed on the control console)

the voltage to drive this circuit is realized through a linear voltage regulator:
check for DL5 and DL6 ON  
in case of DL6 not ON, check that R13 is not open  
and check of voltage output on U1  
the gate circuit is also driven by a special chip (MA838)  
In this case check that DL18 is ON while the tube is required to rotate and do not trips off, if trips off than DL25 should turn ON