

**PHILIPS**

**Neusoft**

# NeuViz 16

## Service Trouble Shooting



4541 102 60511  
Revision D

© 2012 Philips and Neusoft Medical Systems

## **Philips and Neusoft Medical Systems**

© 2012 PHILIPS AND NEUSOFT MEDICAL SYSTEMS ALL RIGHTS RESERVED



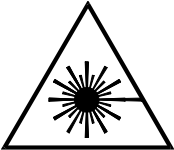

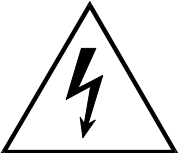
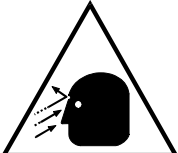
### **Warranty Disclaimer**

PHILIPS AND NEUSOFT PROVIDES THIS DOCUMENT WITHOUT WARRANTY OF ANY KIND, EITHER IMPLIED OR EXPRESSED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

### **Limitation of Liability**

PHILIPS AND NEUSOFT HAS TAKEN CARE TO ENSURE THE ACCURACY OF THIS DOCUMENT. HOWEVER, PHILIPS AND NEUSOFT ASSUMES NO LIABILITY FOR ERRORS OR OMISSIONS AND RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. PHILIPS AND NEUSOFT MAY MAKE IMPROVEMENTS OR CHANGES IN THE PRODUCT(S) OR PROGRAM(S) DESCRIBED IN THIS DOCUMENT AT ANY TIME.

**Symbol Descriptions**

	Attention symbol		Radiation warning symbol
	Laser warning symbol		Biohazard warning symbol
	Magnetism warning symbol		Projectile warning symbol

## ***Revision History***

<b>ECO #</b>	<b>Revision</b>	<b>Date</b>	<b>Comments</b>
	A	August, 2009	New Release
	B	April, 2010	<a href="#">Rotor Control Board LED Indicators</a> on page 2 <a href="#">Stator Control Board LED Indicators</a> on page 11 <a href="#">Patient Table Servo Error Codes</a> on page 30
	C	November 2010	Modified <a href="#">Stator Control Board Error Codes</a> on page 5 Added <a href="#">DMS-DPN RCOM</a> on page 22
	D	December, 2012	Added Flow Chart <a href="#">For Fironia-50:</a> on page 58 Added <a href="#">Table 19: Patient Table Servo A5 Error Codes</a> on page 32

<b>LED and Error Code Description .....</b>	<b>1</b>
Overview .....	1
Rotor Control Board LED Indicators.....	2
Stator Control Board Error Codes .....	5
Stator Control Board LED Indicators.....	11
Control Panel Error Codes .....	13
UCOM Board LED Indicators .....	14
The Unit CAN ID .....	18
RCOM Status and Operation LEDs .....	19
DMS-GNP RCOM.....	20
DMS-DPN RCOM .....	22
Power Control Board LED Indicators .....	24
Slip Ring Receiver and Transmitter Status Indicators.....	25
Stator and Rotor Transceiver Board Status Indicators.....	26
Patient Table Motion Control Board LED Indicators .....	27
Patient Table Servo Error Codes .....	30
Gantry Rotation Servo Error and Warning Message.....	35
Error Message .....	35
Warning Message.....	37
Removing Faults & Warnings .....	38
<b>System Trouble Shooting Flow Chart.....</b>	<b>42</b>
FlowChart overview.....	42
Initial State .....	43
Scan Start .....	44
Recommended Solutions for Hardware Prepare Error .....	47
For Patient Table Prepare Error .....	48

---

For Panel & CTBOX Prepare Error .....	49
For Gantry Rotation Prepare Error .....	50
For Gantry Tilt Prepare Error .....	51
HV Prepare Error .....	52
Collimator Prepare Error .....	53
DMS Prepare Error .....	55
X-Ray On .....	56
HV Trouble Shooting .....	58
ARC Fault (For CHASSIS X3815) .....	59
Anode Overvoltage (For CHASSIS X3815) .....	60
Cathode Overvoltage (For CHASSIS X3815) .....	61
Filament Fault (For CHASSIS X3815) .....	62
TMP Fault (For CHASSIS X3815) .....	63
KV REG Error (For CHASSIS X3815) .....	64
mA REG Error (For CHASSIS X3815) .....	66
Cathode Overcurrent (For CHASSIS X3815) .....	67
Starter Error (For CHASSIS X3815) .....	68
Uncommanded Exposure (For CHASSIS X3815) .....	69
Anode Arc Fault (For Fironia-50) .....	70
Cathode Arc Fault (For Fironia-50) .....	71
Arc (For Fironia-50) .....	72
Anode Overvoltage (For Fironia-50) .....	73
Cathode Overvoltage (For Fironia-50) .....	74
Filament fault (For Fironia-50) .....	75
Inv_tmp Fault (For Fironia-50) .....	76
KV Reg Error (For Fironia-50) .....	77
mA Reg Error (For Fironia-50) .....	79
Cathode Overcurrent (For Fironia-50) .....	81
Starter Error (For Fironia-50) .....	82
Data Path .....	85
Data Path Overview Block Diagram .....	86
Data Path Overview Block Diagram Description .....	87
Description of the Resend Mechanism .....	87
Tools for Troubleshooting Problems .....	87

---

Data Path Troubleshooting Flowchart .....	88
Image Quality Troubleshooting .....	91
Follow HTML on Error log Viewer .....	92
Error Code Description in System Log .....	93
Error Level Description .....	93
Error Code Defination .....	94
Hardware Error Code: HG000*0*0**** .....	94
Detail Coding Description .....	95
Errors Generated by Components .....	96
Software Arithmetic Error Code: SA00000***** .....	96
Software Post-processing Error Code: SS000***** .....	98
Software User Interface Error Code: SU000***** .....	99

# LED and Error Code Description

## Overview

This section includes the LED descriptions and Error Codes or Error Messages for troubleshooting:

[Rotor Control Board LED Indicators](#) on page 2

[Stator Control Board Error Codes](#) on page 5

[Stator Control Board LED Indicators](#) on page 11

[Control Panel Error Codes](#) on page 13

[UCOM Board LED Indicators](#) on page 14

[RCOM Status and Operation LEDs](#) on page 19

[Power Control Board LED Indicators](#) on page 24

[Patient Table Motion Control Board LED Indicators](#) on page 27

[Slip Ring Receiver and Transmitter Status Indicators](#) on page 25

[Stator and Rotor Transceiver Board Status Indicators](#) on page 26

[Patient Table Servo Error Codes](#) on page 30

[Gantry Rotation Servo Error and Warning Message](#) on page 35



## Rotor Control Board LED Indicators

The figure below shows the position of the LED indicators on Rotor Control Board.

**NOTE** See [Table 1](#) on page 3 for the description of the LED indicators on Rotor Control Board.

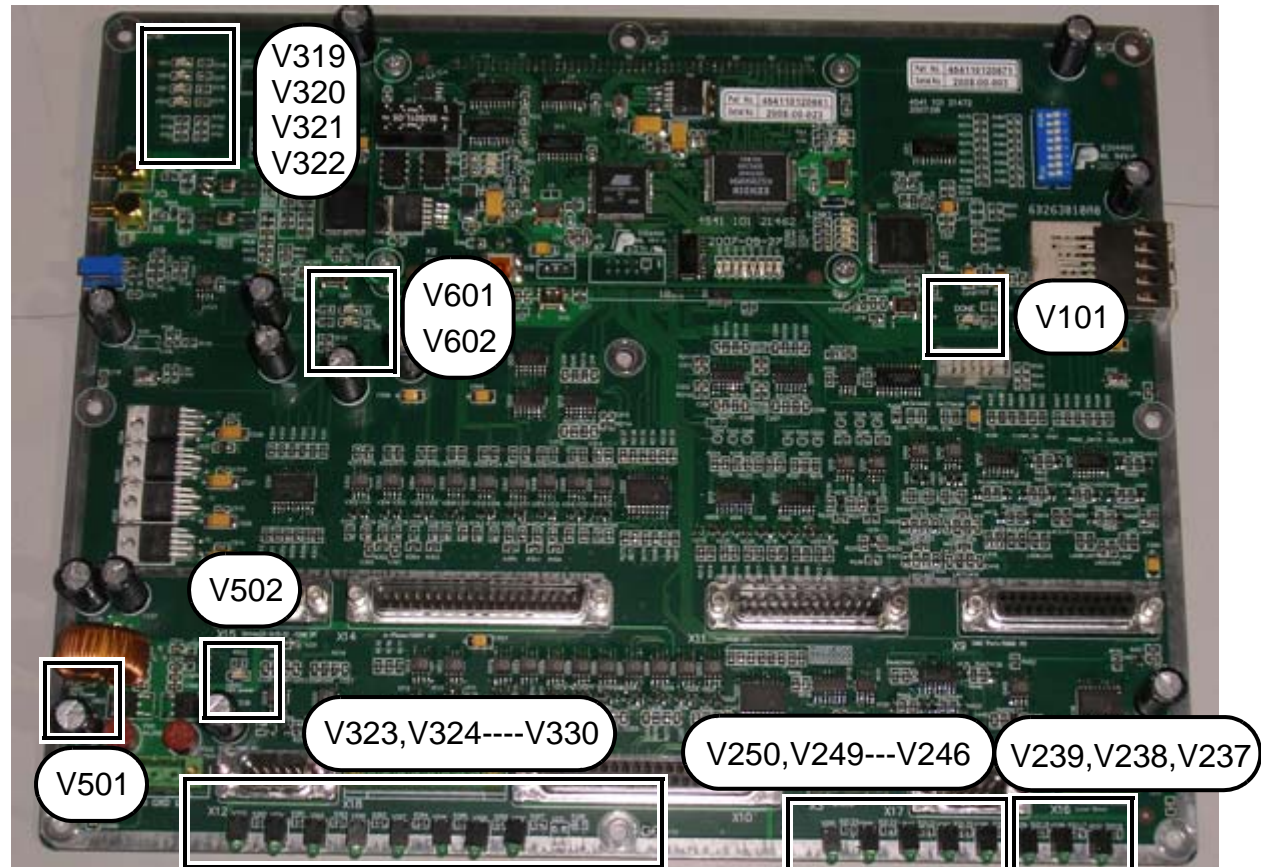


Figure 1: Rotor Control Board LED Indicators

**Table 1: Rotor Control Board LED Description**

LED NO.	Description
V101	FPGA configuration Status indicator.When on, indicates FPGA configuration is OK
V237	Optical RX ready: when on, indicates the data of DMS optical fiber is ready
V238	NL test on: when on, indicates the No Load Test mode is enabled
V239	FAULT: when on indicates the HV generator is in a fault mode
V246	HV on. When on, indicates the high voltage is present on the output of the generator
V247	GM on. When on, indicates the grid module of HV generator is on;
V248	NL test on, When on, indicates the No Load Test mode is enable
V249	Starter on.When on, indicates the starter of HV generator is on
V250	Contactor on: When on, Indicates the main contactor of HV generator is on
V319	FPGA inner DCM status.When on, DCM is locked
V320	RX_CRC_ERROR.Slipring receiving data CRC check status, when CRC check error one time, it will be on 200ms then off.
V321	Get command frame indicator.It will be on 200ms the off when Rotor Control Board receiving a command frame from Stator Control Board
V322	Couch Pulses indicator
V323	Integration Period Pulses Indicator
V324	RCOM Status Indicator.When on, DMS RCOM is OK
V325	Make Bias indicator, When on, DMS make Bias successfully.
V326	Make_data Indicator, When on, DMS is making data
V327	Slice width error. When on, indicates Slice width of A-Plane is error
V328	Z position error. When on, indicates Z position of A-Plane is error
V329	Filter error. When on, Indicates HV generator is error
V330	Focus Follow error.When on, Indicates Focus Follow of APLANE is error

**Table 1: Rotor Control Board LED Description**

LED NO.	Description
V501	5V input Power Indicator.When on,5V input Power is available
V502	12V input Power Indicator.When on,12V input Power is available
V601	Slip ring Link fault Indicator.When on, indicates Slip ring Link fault.
V602	Code Rule Violation Detected. When on, indicates code runs at Slip ring Link is error.

## Stator Control Board Error Codes

When Gantry is connected to Console, the System Error Code corresponds to Stator Control Board Error Code. [Table 2](#) on page 6 includes the description of the Error Codes on Stator Control Board vs System Error Code.

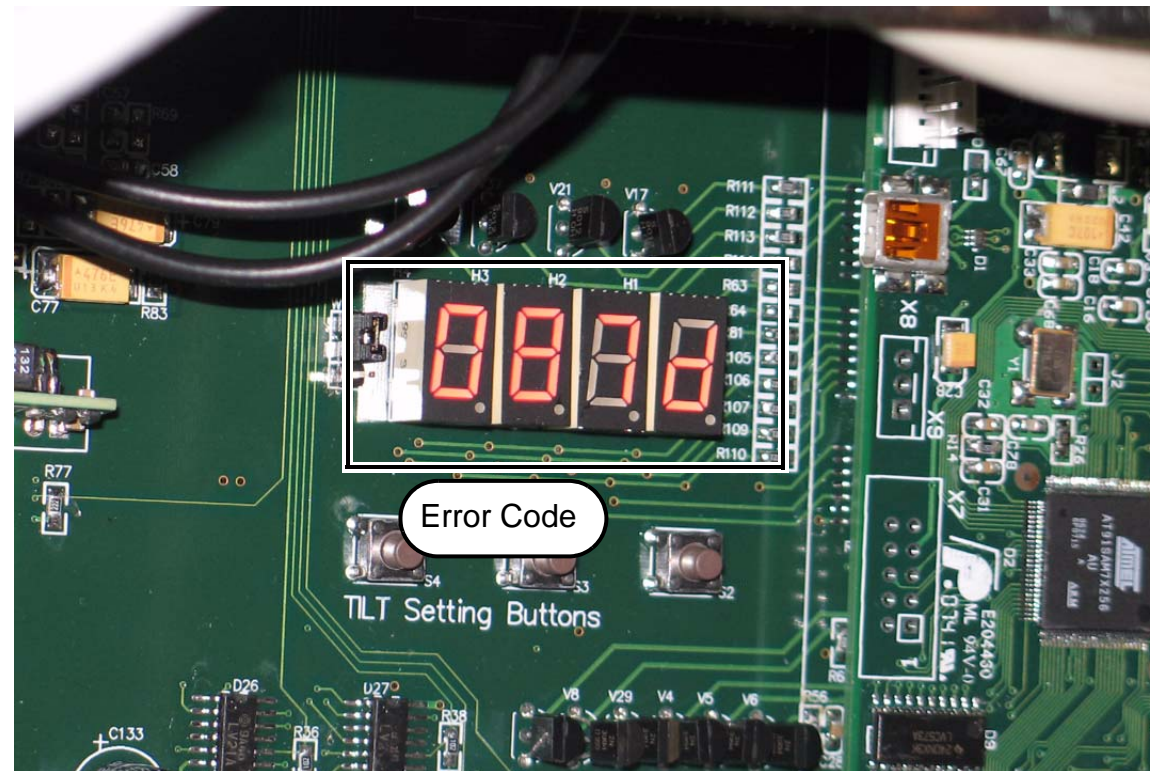


Figure 2: Stator Control Board Error Code

**Table 2: Stator Control Board Error Code vs System Error Code**

Error Code	Description	System Error Code
8.8.8.8.	LED display inspect, the last dot is PPS (pulse per second) signal	--
Uxxx	Firmware Version	--
Pcbx	PCB Version	--
rdy	System work normal	--
Hxxx	Binary value of the Tilt measure potentiometer voltage on Stator control board	--
<b>Erxx</b>	<b>Stator control board detected error information, On/off 2 times in 2s.</b>	--
Er00	Continuous tilt motion time-out	0x5403
Er01	Tilt angle change abnormal when tilting	0x5404
Er02	No Tilt angle change when tilting	0x5405
Er03	Positive tilt relay abnormal	0x5406
Er04	Negative tilt relay abnormal	0x5407
Er05	Tilt enable relay abnormal	0x5408
Er06	Tilt arm sense switch abnormal	0x5410
Er07	Read tilt angle data error in EEPROM	0x5412
Er08	Tilt angle display abnormal	0x5413
Er09	Rotate motor servo warning	0x5502
Er0a	Rotation pulse sample abnormal	0x5503
Er0b	Continuous rotation time-out	0x5504
Er0c	Stop rotation time-out	0x5505
Er0d	The tolerance of the torque voltage between measurement value and output value greater than set value	0x5506
Er0e	Gantry foot switch error	0x5601
Er0f	The cable between Ghost and Gantry interface board abnormal	0x5602

**Table 2:** Stator Control Board Error Code vs System Error Code

Error Code	Description	System Error Code
Er10	The connection test 1 between UCOM and Stator Control board abnormal	0x5603
Er11	The connection test 2 between UCOM and Stator Control board abnormal	0x5604
Er12	The communication of temperature measurement board time-out	0x5605
Er13	Temperature measurement board communication CRC error	0x5606
Er14	Stator control board A/D converter communication time-out	0x5607
Er15	Stator control board A/D converter self-detect failed	0x5608
Er16	Send CAN command time-out	0x5701
Er17	CAN inquiry command time-out	0x5702
Er18	CAN respond command error	0x5703
Er19	Stator control board UCOM respond time-out	0x5704
Er1a	Patient table CAN communication time-out	0x5705
Er1b	Left control panel CAN communication time-out	0x5706
Er1c	Right control panel CAN communication time-out	0x5707
Er1d	CTBOX CAN communication time-out	0x5708
Er1e	Hotlink chip losing lock	0x5709
Er1f	Code runs at Slip ring Link is error.	0x5710
Er20	Slip ring Communication send and receive signal short circuit	0x5711
Er21	Stator control board send Slip ring combination command failed	0x5712
Er22	Stator control board send Slip ring ComOK command failed	0x5713
Er23	Stator control board Send 800us status frame failed	0x5714
Er24	GPC send Slip ring Control command failed	0x5715
Er25	Slip ring R-stop signal available	0x5716
Er26	Stator control board and Data receiving board communication failed	0x5717

**Table 2:** Stator Control Board Error Code vs System Error Code

Error Code	Description	System Error Code
Er27	GPC handles PCI port time-out	0x5718
Er28	The tolerance of the couch code measure value on Stator control board and patient table greater than set value	0x5719
Er29	Patient table error	0x5002,0x5003,0x5006, 0x5007,0x5009,0x5011, 0x5012,0x5014,0x5015, 0x5016,0x5017,0x5018
Er2a	Left control panel error	--
Er2b	Right control panel error	--
Er2c	CTBOX error	--
Er2d	Stator control board UCOM error	0x6208
Er2e	Patient table UCOM error	--
Er2f	Left control panel UCOM error	--
Er30	Right control Panel UCOM error	--
Er31	CTBOX UCOM error	--
Er32	Rotor control board UCOM error	--
Er33	Rotor Control Board error	--
Er34	DMS error	0x5901,0x5903,0x5905 0x5908,0x5909,0x5910 0x5911,0x5913
Er35	HV generator error	0x6101 - 0x6125 0x6128 - 0x6131
Er36	Collimator error	0x6001 - 0x6015 0x6019 - 0x6026
Er37	ECG error	0x5721

**Table 2:** Stator Control Board Error Code vs System Error Code

Error Code	Description	System Error Code
Er38	Rotor Motor overspeed	0x5507
Er39	First-view overtime	0x5724
Er3a	Combination command start-up failed	0x5726
Er3b	Stator Control Board EEPROM self-detect failed	0x5727
Er3c	Monitor Chanel failed simutaneously	0x5729
<b>nxx</b>	<b>Stator Control Board detected warning information, On/Off once in 2s</b>	
n00	Gantry negative tilt limit	0x5401
n01	Gantry positive tilt limit	0x5402
n02	Gantry manual control on	0x5409
n03	Gantry front cover open	0x5411
n04	Gantry rotate motor servo not ready	0x5501
n05	Gantry rotate motor servo work in Torque mode	--
n06	Gantry not found rotate zero position	--
n07	CT room door open	Error0429
n08	Main power voltage abnormal	0x5508
n09	Patient table not find horizontal zero position	--
n0a	Stator Control Board ComOK signal overtime	0x5723
n0b	Patient Table Warning	0x5001,0x5013,0x5004 0x5005,0x5008,0x5010 0x5019
n0c	Left Control Panel Warning	0x5101 - 0x5104
n0d	Right Control Panel Warning	0x5201 - 0x5204
n0e	CTBOX Warning	0x5301 - 0x5304



**Table 2:** Stator Control Board Error Code vs System Error Code

Error Code	Description	System Error Code
n0f	Patient Table UCOM Warning	0x6301 - 0x6307
n10	Left Control Panel UCOM Warning	0x6401 - 0x6407
n11	Right Control Panel UCOM Warning	0x6501 - 0x6507
n12	Stator Control Board UCOM Warning	0x6201 - 0x6207
n13	Rotor Control Board UCOM Warning	0x6601 - 0x6505
n14	Rotor Control Board Warning	0x5802
n15	DMS Warning	0x5904,0x5906,0x5907 0x5912,0x5914,0x5915
n16	HV Warning	0x6126,0x6127 0x6132 - 0x6137
n17	Collimator Warning	0x6016 - 0x6018
n18	Monitor Channel A Warning	0x5728
n19	Monitor Channel B Warning	0x5728

## Stator Control Board LED Indicators

[Table 3](#) on page 12 includes the description of the LED indicators on Stator Control Board. The figure below shows the position of the LED indicators on the Stator Control Board.

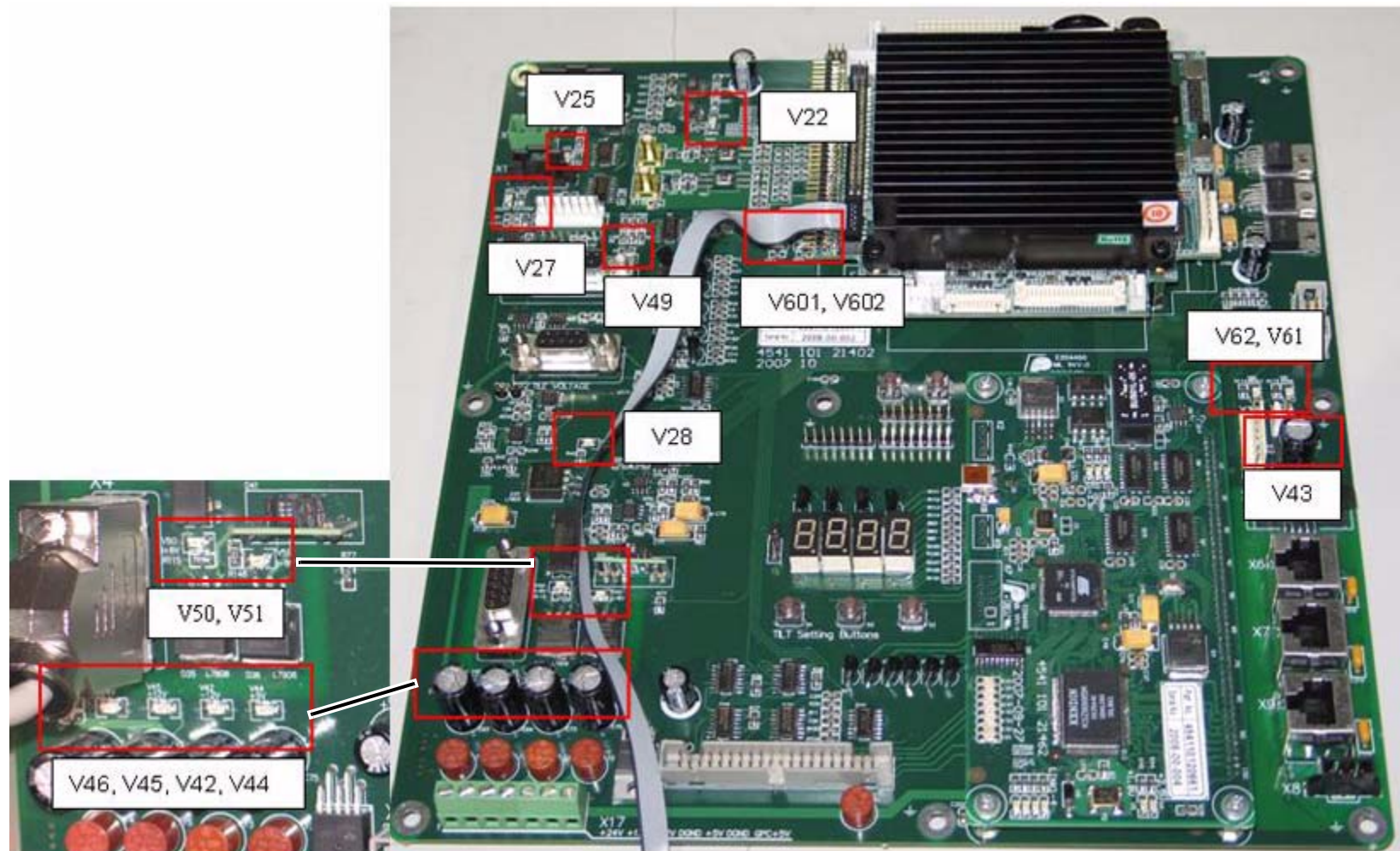


Figure 3: Stator Control Board LED Indicators

**Table 3:** Stator Control Board LED Description

LED NO.	Description
V22	Gantry located at rotate zero position
V25	Slip ring R-stop signal normal
V27	Patient table horizontal encoder phase A signal at high level
V28	+5V power indicator of analog part
V42	-12 V power input to stator control board
V43	+5V power input to GPC
V44	+5V power input to Stator control board
V45	+12V power input to Stator control board
V46	+24V power input to Stator control board
V48	GPC handles PCI port of the Stator control board normal
V49	Rotate motor servo warning
V50	ECG isolation interface +8V power supply
V51	ECG isolation interface -8V power supply
V61	FPGA download completed
V62	FPGA not reset, work normal
V601	Slip ring Link fault.
V602	Code runs at Slip ring Link is error. (The microlight is the same with light off )

## Control Panel Error Codes

[Table 4](#) on page 13 includes the Error Codes of the Control panel.

**Table 4:** Control Panel Error Code

Error Code	Description
PErr	The Control Panel CAN plug mistake insert into the Patient table CAN port, which located at the Gantry Interface Board
CErr	Not receive the signal from the UCOM
Err3	Patient Table Height error
Err4	Gantry Tilt Error
Err5	The Communication between Panel and Stator Control Board time-out
Err6	The Communication between Panel and Patient Table Motion control Board time-out



## UCOM Board LED Indicators

[Table 5](#) on page 15 includes the LED indicators on UCOM of the Stator Control Board, Control Panel, Patient table. The figure below shows the position of the LED indicators.

[Table 9](#) on page 18 includes the LED indicators on the UCOM of the Rotor Control Board.

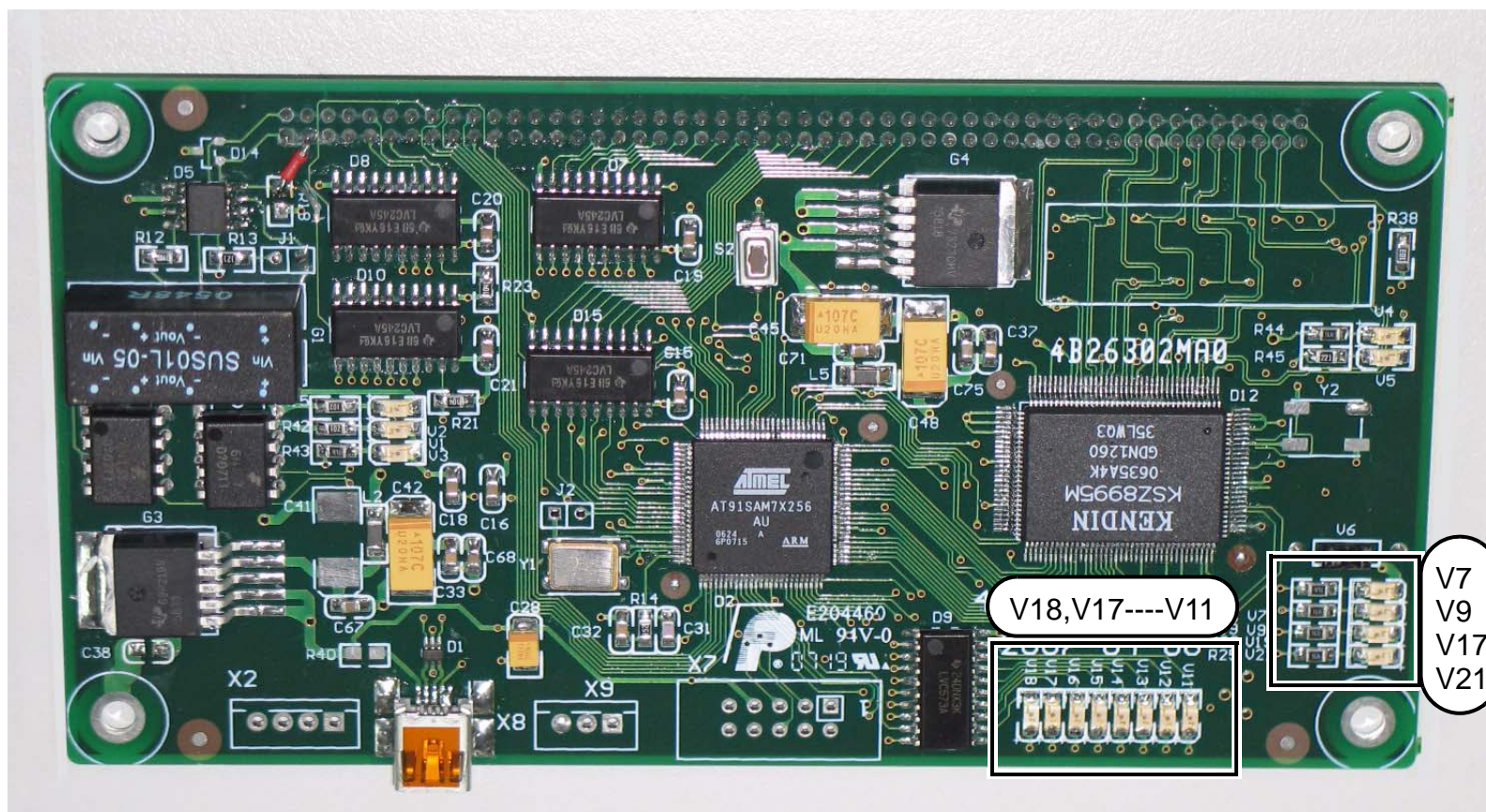


Figure 4: UCOM LED Indicators

**Table 5: UCOM on Stator Control Board, Control Panel, Patient table**

LED NO.	Description
V7	On means the network connection state between the Left Panel UCOM and the Stator Control Board UCOM is OK
V9	On means the network connection state between the Patient Table Control Board UCOM and the Stator Control Board UCOM is OK
V19	On means the network connection state between the Console and Stator Control Board UCOM is OK
V21	On means the network connection state between the GPC and the Stator Control Board UCOM is OK
V11	If LED on means CAN port is failed
V12	If LED on means SPI port is failed
V13	If LED on means FLASH port is failed
V14	If LED on means one of monitor voltage failed
V15	If LED on means that is normal firmware, otherwise it means backup firmware
V16,V17,V18	Indicate unit CAN ID

**Table 6: UCOM on Left Control Panel**

LED NO.	Description
V7	On means the network connection state between the Left Panel UCOM and the Stator Control Board UCOM is OK
V9	On means the network connection state between the Left Panel UCOM and the Right Panel UCOM is OK
V19	OFF
V21	OFF
V11	If LED on means CAN port is failed
V12	If LED on means SPI port is failed
V13	If LED on means FLASH port is failed
V14	If LED on means one of monitor voltage failed
V15	If LED on means that is normal firmware, otherwise it means backup firmware

**Table 6: UCOM on Left Control Panel**

LED NO.	Description
V16,V17,V18	Indicate unit CAN ID

**Table 7: UCOM on Right Control Panel**

LED NO.	Description
V7	OFF
V9	On means the network connection state between the Left Panel UCOM and the Right Panel UCOM is OK
V19	OFF
V21	OFF
V11	If LED on means CAN port is failed
V12	If LED on means SPI port is failed
V13	If LED on means FLASH port is failed
V14	If LED on means one of monitor voltage failed
V15	If LED on means that is normal firmware, otherwise it means backup firmware
V16,V17,V18	Indicate unit CAN ID

**Table 8: UCOM on Patient Table Motion Control Board**

LED NO.	Description
V7	On means the network connection state between the Patient Table Motion Control Board UCOM and the Stator Control Board UCOM is OK
V9	OFF
V19	OFF
V21	OFF
V11	If LED on means CAN port is failed

**Table 8: UCOM on Patient Table Motion Control Board**

LED NO.	Description
V12	If LED on means SPI port is failed
V13	If LED on means FLASH port is failed
V14	If LED on means one of monitor voltage failed
V15	If LED on means that is normal firmware, otherwise it means backup firmware
V16,V17,V18	Indicate unit CAN ID



**Table 9: UCOM Board on Rotor Control Board**

LED NO.	Description
V7	OFF (no network connection)
V9	OFF (no network connection)
V19	OFF (no network connection)
V21	OFF (no network connection)
V11	If LED down means parallel port is failed
V12	If LED down means SPI port is failed
V13	If LED down means FLASH port is failed
V14	If LED down means one of monitor voltage failed
V15	If LED down means that is backup firmware, otherwise it means normal firmware
V16,V17,V18	Indicate unit CAN ID

## The Unit CAN ID

The V16, V17, V18 LED indicators, “1” means the LED is On, “0” means the LED is Off.

**Table 10: The Unit CAN ID**

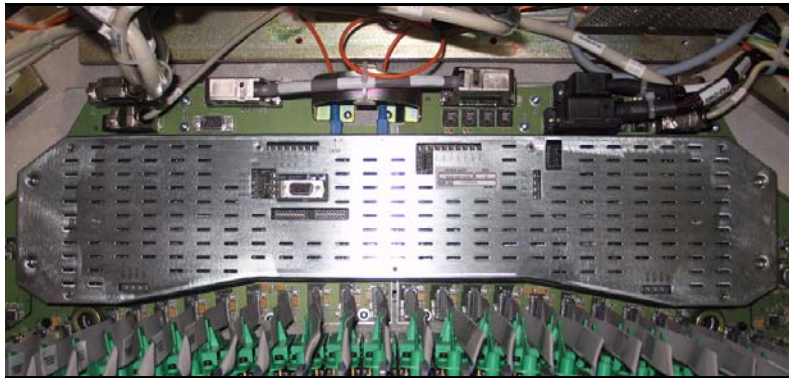
Unit	CAN ID	V18	V17	V16
Stator Control Board	2	0	1	0
Patient Table Motion Control Board	3	0	1	1
Left Panel	0	0	0	0
Right Panel	1	0	0	1
Rotor Control Board	5	1	0	1

## RCOM Status and Operation LEDs



### CAUTION

There are two types of RCOM assemblies. Refer to to identify your DMS type .



RCOM for DMS-GPN

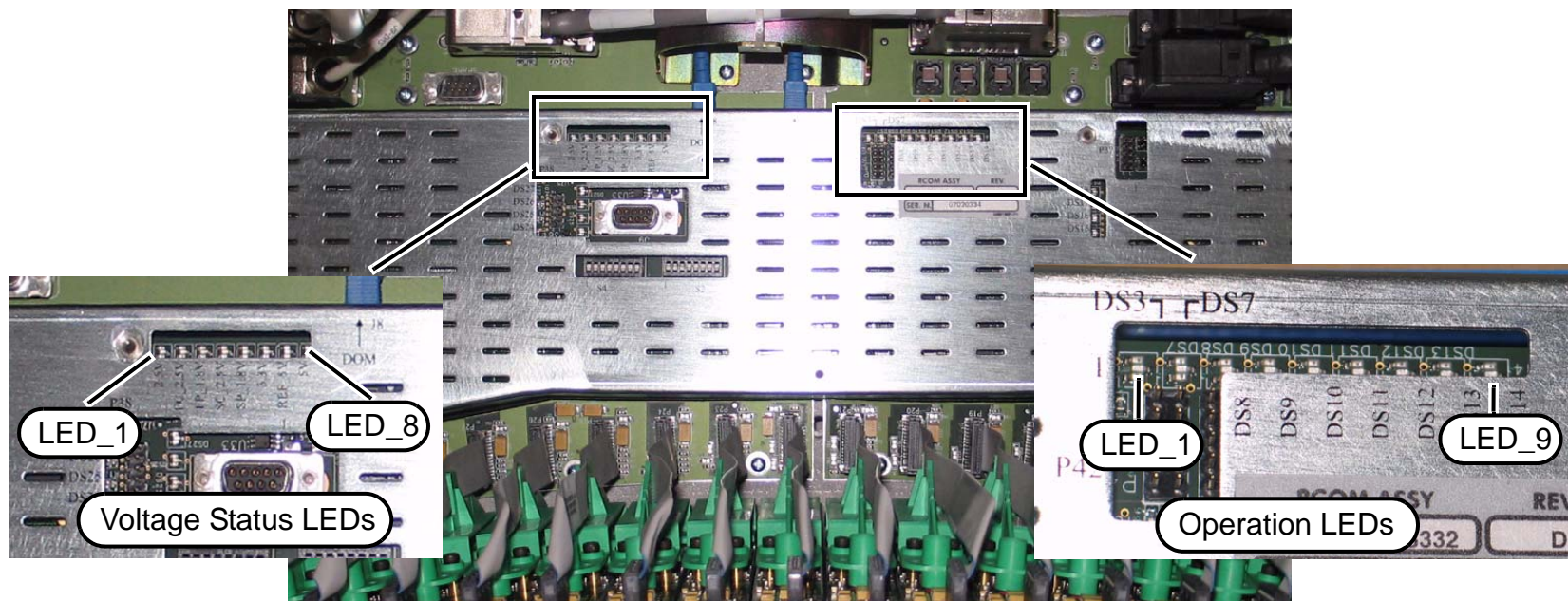


RCOM for DMS-DPN

Figure 5: RCOM

## DMS-GNP RCOM

[Table 11](#) on page 20 includes the description of the Status LED indicators on RCOM Assy. [Table 12](#) on page 21 includes the description of the RCOM Operation LED indicators on the RCOM Assy.



**Figure 6: RCOM ASSY**

**Table 11: RCOM Voltage Status LEDs**

LED NO.	Description (Voltage is OK when LED is on)
LED_1	(DS33) 2.5V Altera regulated
LED_2	(DS23) 2.5V F_Xilinx regulated
LED_3	(DS19) 1.8V F_Xilinx regulated
LED_4	(DS32) 2.5V S_Xilinx regulated
LED_5	(DS28) 1.8V S_Xilinx regulated
LED_6	(DS1) VCC 3.3V
LED_7	(DS34) 3.3 to 5V Step-Up (reference converter)

**Table 11: RCOM Voltage Status LEDs**

LED NO.	Description (Voltage is OK when LED is on)
LED_8	(DS35) 3.3 to 5V Step-Up (communication circuit)

**Table 12: RCOM Operation LEDs**

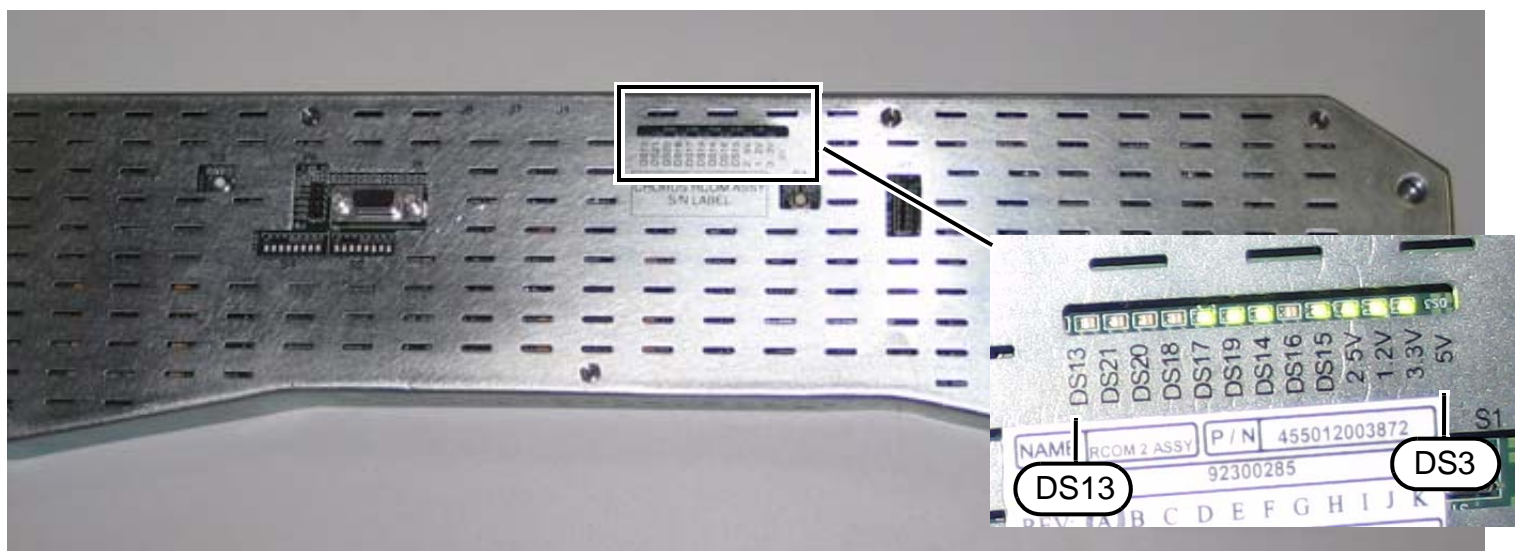
LED NO.	Description
LED_1	(DS3) Readings_Run (Flashes at readings transmission rate)
LED_2	(DS7) Readings_Run (Flashes at readings transmission rate)
LED_3	(DS8) Readings_Run (Flashes at readings transmission rate)
LED_4	(DS9) Reserved
LED_5	(DS10) 1) In "Resend Mode" LED indicates Resend events 2) Not in "Resend Mode" LED lights at rotation index point
LED_6	(DS11) Fan_1 Fault, disconnected, stuck or runs too slow
LED_7	(DS12) Fan_2 Fault, disconnected, stuck or runs too slow
LED_8	(DS13) Make_Bias, On when Make_Bias signal is on
LED_9	(DS14) Make_Data, On when Make_Data signal is on

**LEDs 1- 3 have two modes of operation:**

- When RCOM has NO errors (RCOM\_OK bit = 1)
  - LED\_1 blinks at a HIGH rate
  - LED\_2 blinks at a MEDIUM rate
  - LED\_3 blinks at a LOW rate
- When RCOM has errors (RCOM\_OK bit = 0)
  - All three LEDs blink at the same low rate

## DMS-DPN RCOM

[Table 11](#) on page 20 includes the description of the Status LED indicators on RCOM Assy. [Table 12](#) on page 21 includes the description of the RCOM Operation LED indicators on the RCOM Assy.



**Figure 7: RCOM ASSY**

**Table 13: RCOM Voltage Status & Operation LEDs**

LED NO.	Description (Voltage is OK when LED is on)
DS13	Make Data_LED is On when this signal is on, indicating scan process
DS12	Make Bias_LED is On when this signal is on, indicating scan process
DS20	Not used
DS18	DIP SW2 (1) LED Indicator
DS17	Not used
DS19	Not used
DS14	Reading Run_ the LEDs are flashing according to readings transmission rate (IP rate)
DS16	Reading Run_ the LEDs are flashing according to readings transmission rate (IP rate)

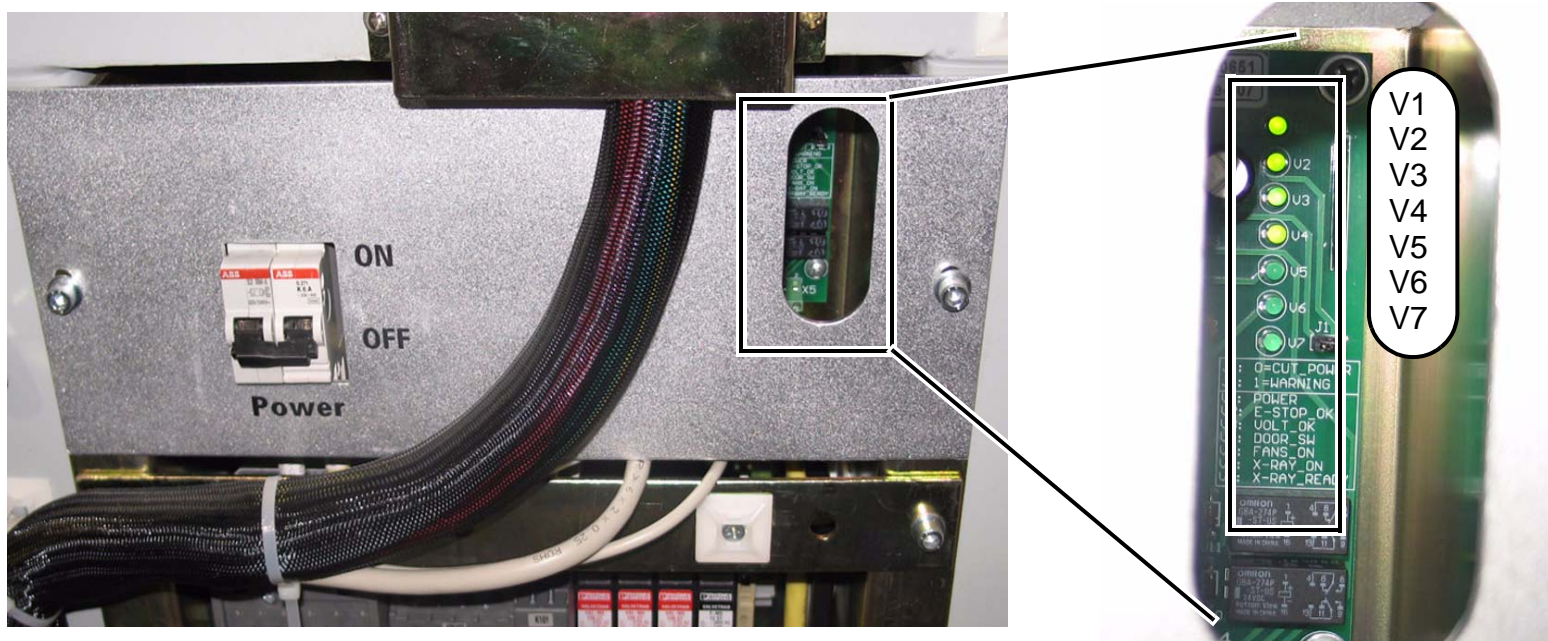
**Table 13:** RCOM Voltage Status & Operation LEDs

LED NO.	Description (Voltage is OK when LED is on)
DS15	Reading Run_ the LEDs are flashing according to readings transmission rate (IP rate)
DS2	2.5V
DS1	1.2V (ON) After FPGA U14 Loads
DS4	3.4V
DS3	5V



## Power Control Board LED Indicators

[Table 14](#) includes the description of the LED indicators on Power Control Board. The figure below shows the position of the LED indicators.



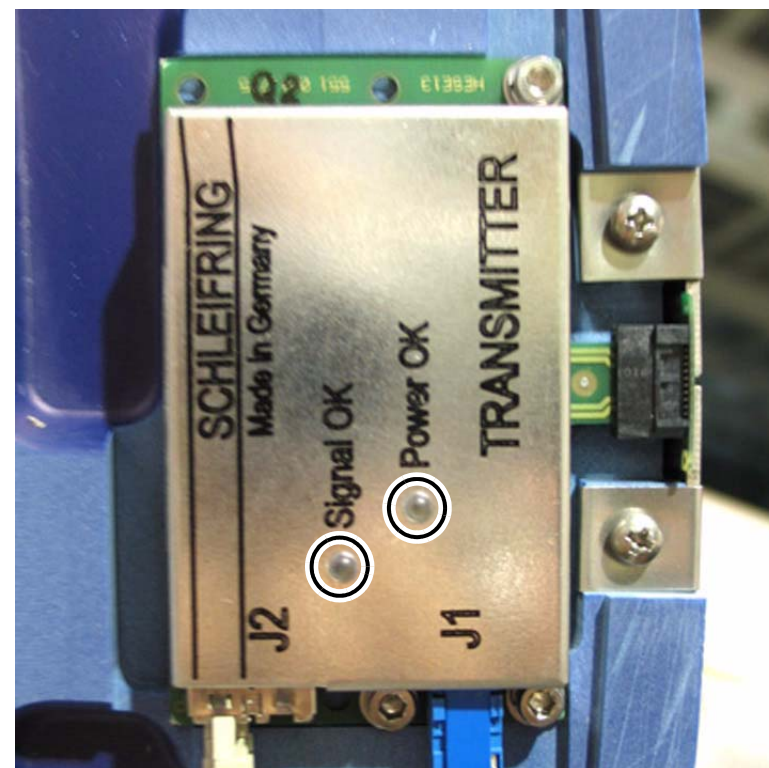
**Figure 8: Power Control Board LED Indicators**

**Table 14: Power Control Board LED Description**

LED NO.	Description
V1	Power
V2	E-stop_ok
V3	Voltage_ok
V4	Door_SW
V5	Fans_on
V6	X-ray_on
V7	X-Ray_ready

## Slip Ring Receiver and Transmitter Status Indicators

On each Module (Transmitter and Receiver) there are two status LED indicators: one for On-Board power and one for Signal/Carrier detected. Power indicator LED is green, Signal LED is yellow.



**Figure 9: Receiver and Transmitter**

Assignment of LEDs and signals in error condition are described in [Table 15](#) on page 25.

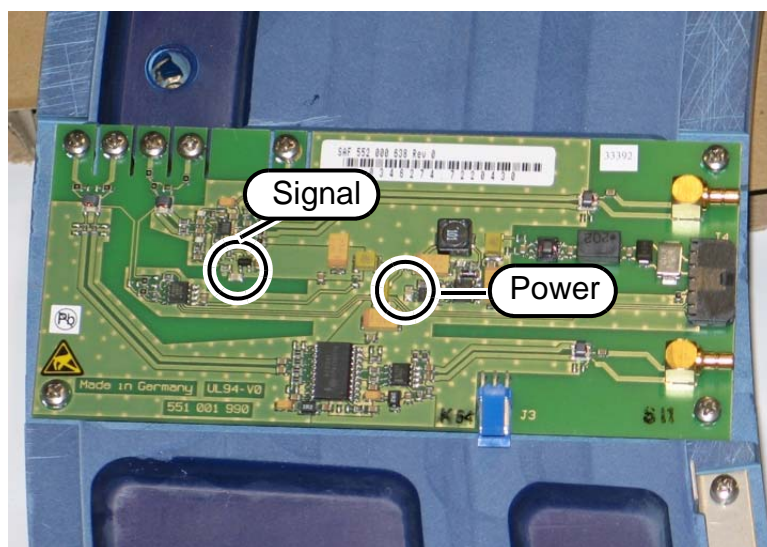
**Table 15: Receiver and Transmitter Status Indicators**

Name	LED Color	LED Status if in Error
Power Ok	Green	Off
Signal OK	Yellow	Off

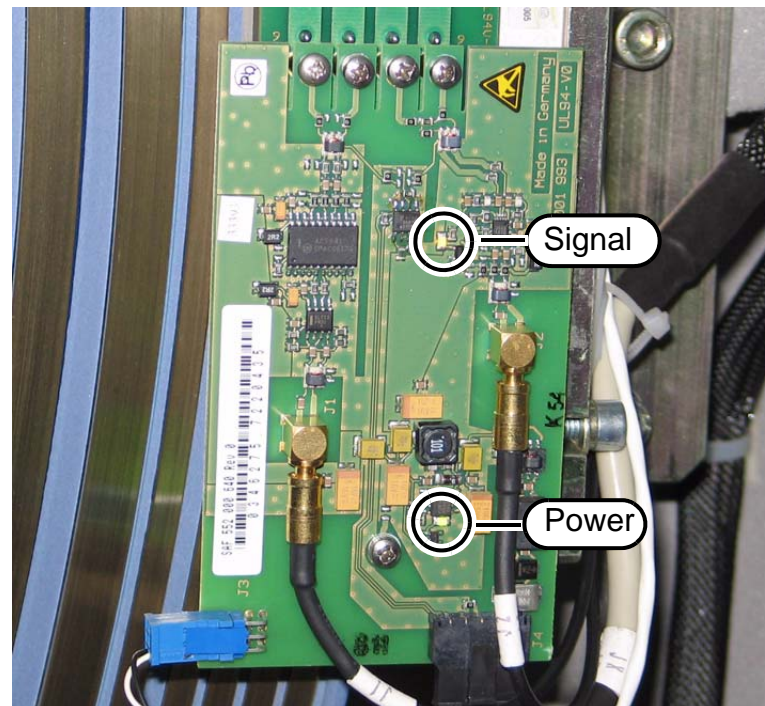


## Stator and Rotor Transceiver Board Status Indicators

On each board there are two status LED indicators: one for On-Board power and one for Signal detected. Normally, the Power indicator LED is always ON and the Signal LED is On. When the Transceiver Board is receiving a signal, the Signal LED is blinking.



Rotor Transceiver Board



Stator Transceiver Board

**Figure 10: Stator and Rotor Transceiver Board**

Assignment of LEDs and signals in error condition are described in [Table 16](#).

**Table 16: Stator and Rotor Transceiver Board LED**

Name	LED Color	Description
Power	Green	LED on means work normal, LED off if in error
Signal	Yellow	LED on means work normal, LED blinking means receiving signal, and LED off if in Error



## Patient Table Motion Control Board LED Indicators

[Table 17](#) on page 28 includes the description of the LED indicators on Patient Table Motion Control Board. The following figure shows the LED position on the Patient Table Motion Control Board.

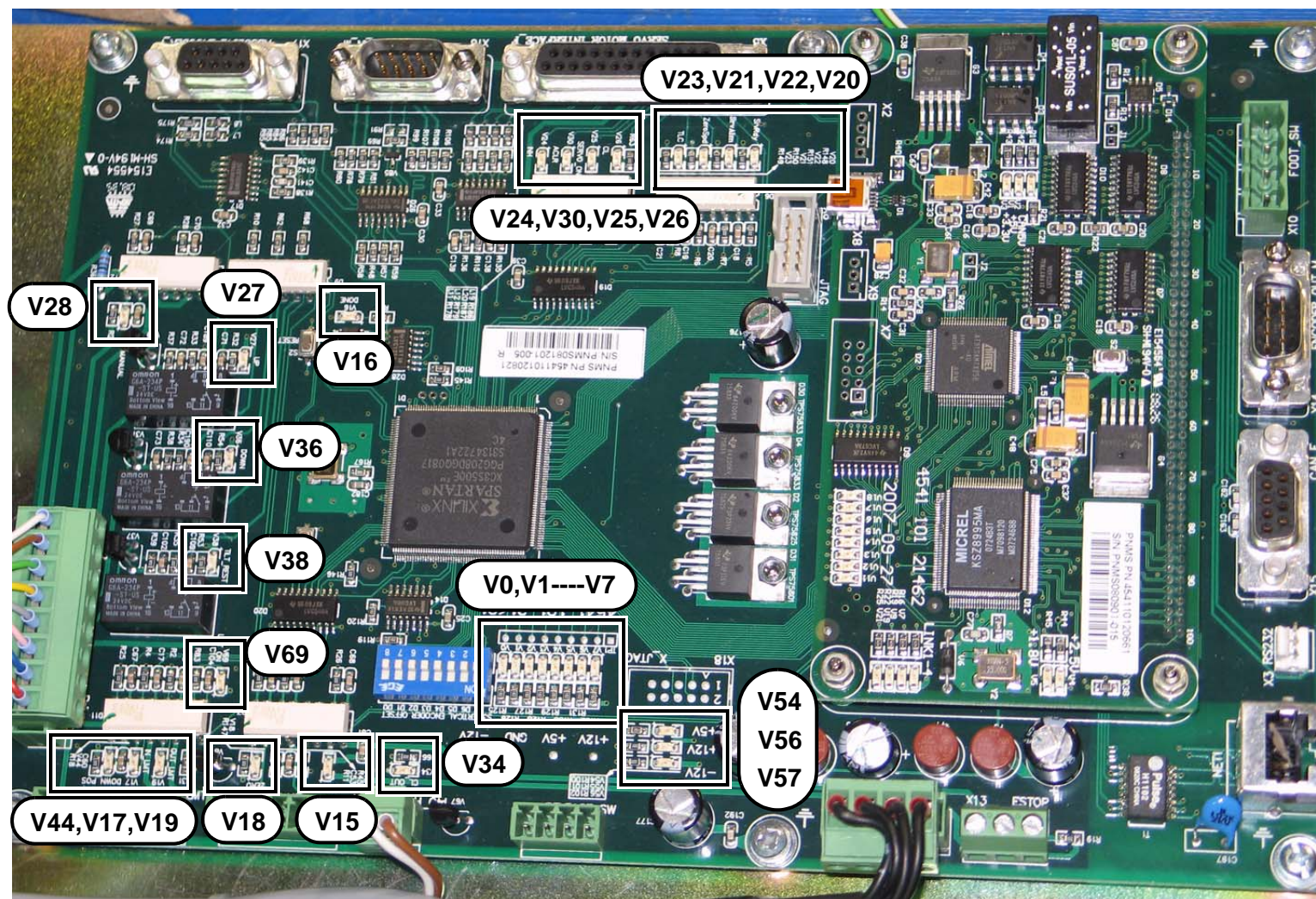


Figure 11: Patient Table Motion Control Board

**Table 17: Patient Table Motion Control Board LED**

LED NO.	Description
V0	Debug LED Indicator
V1	Debug LED Indicator
V2	Debug LED Indicator
V3	Debug LED Indicator
V4	Debug LED Indicator
V5	Debug LED Indicator
V6	Debug LED Indicator
V7	Debug LED Indicator
V15	E-Stop Emergency LED, ON means the 24V power input is available
V16	Firmware Download Done LED, ON means the FPGA firmware download completed
V17	Front Limit Switch LED, OFF means the Front Limit Switch is pressed
V18	Zero Position Switch LED, ON means the Zero Position switch is pressed
V19	OUT Position Switch LED, OFF means the OUT Position Switch is pressed
V20	Servo Ready LED, ON means the Servo is ready.
V21	ZERO Speed LED, ON means the speed of the Horizontal motor lower than 50 RPM
V22	SERVO Alarm LED, OFF means the Servo have Error alarm
V23	TLC (Torque Limit Control) LED, ON means the Servo in torque limit control mode
V24	INH LED, ON means the input pulse of the Servo is available
V25	Servo Enable LED, ON means the Servo is enabled
V26	Servo Deviation Counter reset LED, ON means the inner deviation counter of Servo is reset.
V27	Up patient table LED, ON means the Patient table Up button is pressed
V28	Manual Control LED, ON means the Patient table is in manual control mode

**Table 17: Patient Table Motion Control Board LED**

LED NO.	Description
V30	ACLR (Alarm Clear) LED, ON means clear the Servo alarm
V32	Patient Table Float Switch 2 LED, ON means the Float switch 2 is pressed
V33	Foot Switch 2 LED, ON means the foot switch 2 is pressed.
V34	Patient table float output LED, ON means the Patient table top is locked.
V35	Foot Switch 1 LED, ON means the Foot switch 1 is pressed.
V36	Lower Patient Table LED, ON means the Patient Table Lower Button is pressed.
V38	Vertical Up and Down enable LED, ON means the vertical up and down is enabled
V44	Down Position Switch LED, ON means the patient table higher than Down position
V46	Patient Table Float Switch 1 LED, ON means the float switch 1 is pressed
V54	5V power LED, ON means the 5V power input is normal
V55	+12V power LED, ON means the +12V power input is normal
V56	-12v power LED, ON means the -12V power input is normal
V69	Servo Control LED, ON means the Servo work normal

## Patient Table Servo Error Codes

There are two kinds of Patient Table Servo.

[Table 18](#) on page 30 lists the Patient Table **Servo A4** error codes and descriptions.

[Table 18](#) on page 30 lists the Patient Table **Servo A4** error codes and descriptions.

**Table 18:** Patient Table Servo A4 Error Codes

Error Code	Description
Err11	Control power supply under-voltage protection.
Err12	Over-voltage protection.
Err13	Main power supply under-voltage protection.
Err14	Over-current protection.
Err15	Over-heat protection.
Err16	Over-load protection.
Err18	Over-regeneration load protection.
Err21	Encoder communication error protection.
Err23	Encoder communication data error protection.
Err24	Position deviation excess protection.
Err25	Hybrid deviation excess error protection.
Err26	Over-speed protection.
Err27	Electronic gear error protection.
Err28	External scale communication data error protection.
Err29	Deviation counter overflow protection.
Err35	External scale communication error protection.
Err36	EEPROM parameter error protection.
Err37	EEPROM check code error protection.

**Table 18:** Patient Table Servo A4 Error Codes

Error Code	Description
Err38	Over-travel inhibit input protection.
Err39	Analog input excess protection.
Err40	Absolute system down error protection.
Err41	Absolute counter over error protection.
Err42	Absolute over-speed error protection.
Err44	Absolute single turn counter error protection.
Err45	Absolute multi-turn counter error protection.
Err47	Absolute status error protection.
Err48	Encoder Z-phase error protection.
Err49	Encoder CS signal error protection.
Err50	External scale status 0 error protection.
Err51	External scale status 1 error protection.
Err52	External scale status 2 error protection.
Err53	External scale status 3 error protection.
Err54	External scale status 4 error protection.
Err55	External scale status 5 error protection.
Err65	CCWTL input excess protection
Err66	CWTL input excess protection.
Err95	Motor automatic recognition error protection.

**Table 19:** Patient Table Servo A5 Error Codes

Error Code	Description
110	Control power supply undervoltage protection
120	Over-voltage protection
130	Main power supply undervoltage protection (between P to N)
131	Main power supply undervoltage protection (AC interception detection)
140	Over-current protection
141	IPM error protection
150	Over-heat protection
160	Over-load protection
180	Over-regeneration load protection
181	Over-regeneration Tr error protection
210	Encoder communication disconnect error protection
211	Encoder communication error protection
230	Encoder communication data error protection
240	Position deviation excess protection
241	Velocity deviation excess protection
250	Hybrid deviation excess error protection
260	Over-speed protection
261	2nd over-speed protection
270	Command pulse input frequency error protection
272	Command pulse multiplier error protection
280	Limit of pulse replay error protection
290	Deviation counter overflow protection

**Table 19:** Patient Table Servo A5 Error Codes

Error Code	Description
300	Safety detection
330	IF overlaps allocation error 1 protection
331	IF overlaps allocation error 2 protection
332	IF input function number error 1 protection
333	IF input function number error 2 protection
334	IF output function number error 1 protection
335	IF output function number error 2 protection
336	CL fitting error protection
337	INH fitting error protection
340	Software limit protection
360,361,362	EEPROM parameter error protection
370,371,372	EEPROM check code error protection
380	Over-travel inhibit input protection
390	Analog input1 excess protection
391	Analog input2 excess protection
392	Analog input3 excess protection
400	Absolute system down error protection
410	Absolute counter over error protection
420	Absolute over-speed error protection
430	Initialization failure
440	Absolute single turn counter error protection
450	Absolute multi-turn counter error protection
470	Absolute status error protection



**Table 19:** Patient Table Servo A5 Error Codes

Error Code	Description
480	Encoder Z-phase error protection
490	Encoder CS signal error protection
500	Feedback scale connection error protection
501	Feedback scale communication error protection
510	Feedback scale status 0 error protection
511	Feedback scale status 1 error protection
512	Feedback scale status 2 error protection
513	Feedback scale status 3 error protection
514	Feedback scale status 4 error protection
515	Feedback scale status 5 error protection
550	A-phase connection error protection
551	B-phase connection error protection
552	Z-phase connection error protection
870	Compulsory alarm input protection
950,951,952,953,954	Other Error

# Gantry Rotation Servo Error and Warning Message

## Error Message

Errors which occur appear as an error number in the LED display on the front panel. All errors result in the BTB/RTO contact opening and the output stage of the amplifier is switched off (motor loses all torque). If a motor-holding brake is installed, it will be activated.

**Table 20:** Gantry Rotation Servo Error Message

Error Code	Destination	Explanation
F 01*	Heat sink temperature	Heat sink temperature too high, limit is set by manufacturer to 80°C (176°F)
F 02*	Over-voltage	Over-voltage in DC-link, limit depends on the mains supply voltage
F 03*	Following error	Message from the position controller
F 04	Feedback	Cable break, short circuit, short to ground
F 05*	Under-voltage	Under-voltage in DC-link, limit is set by manufacturer to 100V
F 06	Motor temperature	Motor temperature too high, limit is set by manufacturer to 145°C (293°F)
F 07	Aux. voltage	Internal aux. voltage not OK
F 08*	Overspeed	Motor running away, speed is too high
F 09	EEPROM	Checksum error
F 10	Flash-EPROM	Checksum error
F 11	Brake	Cable break, short circuit, short to ground
F 12	Motor phase	Missing (cable break or similar)
F 13*	Internal temperature	Internal temperature too high
F 14	Output stage	Fault in the output stage
F 15	I <sup>2</sup> t max	I <sup>2</sup> t max. value exceeded
F 16*	Supply - BTB/RTO	2 or 3 phases missing in the supply feed
F 17	A/D converter	Error in the analog-digital conversion, usually caused by excessive EMI

**Table 20:** Gantry Rotation Servo Error Message

Error Code	Destination	Explanation
F 18	Regen	Regen circuit faulty or incorrect setting
F 19*	supply phase	A supply phase is missing (can be switched off for 2-phase operation)
F 20	Slot fault	Hardware fault of the expansion card
F 21	Handling fault	Software fault of the expansion card
F 22	Short circuit to earth (ground)	SERVOSTAR 640/670 only: short circuit to earth (ground)
F 23	CAN Bus off	CAN Bus total communication error
F 24	Warning	Warning displays as error
F 25	Commutation error	Encoder systems only
F 26	Limit switch	Homing error (hardware limit switch reached)
F 27	AS-option	Operating error for AS-option
F 28	Reserved	Reserved
F 29	SERCOS	SERCOS error
F 30	Emerg. Stop	Emerg. Stop
F 31	Reserved	Reserved
F 32	System error	System software not responding correctly

**\* These error messages can be cancelled by the ASCII command CLRFAULT, without executing a reset. If only these errors are present, and the RESET button or the I/O-function RESET is used, the CLRFAULT command is all that is carried out.**

## Warning Message

Faults which occur, but which do not cause the amplifier to switch-off output stage (BTB/RTO contact remains closed), are indicated in the LED display on the front panel by a coded warning number.

**Table 21:** Gantry Rotation Servo Warning Message

Warning Code	Destination	Explanation
n01	I <sup>2</sup> t	I2t threshold exceeded
n02	Regen power	Preset regen power reached
n03 *	S_fault	exceeded preset contouring error
n04 *	Response monitoring	Response monitoring (fieldbus) is active
n05	Supply phase	Supply phase missing
n06*	Sw limit-switch 1	Passed software limit-switch 1
n07 *	Sw limit-switch 2	Passed software limit-switch 2
n08	motion task error	A faulty motion task was started
n09	No reference point	No reference point set at start of motion task
n10 *	PSTOP	PSTOP limit-switch activated
n11*	NSTOP	NSTOP limit-switch activated
n12	Motor default values loaded	Only sine encoders with ENDAT or HIPERFACE format. Motor number stored in encoder memory different from number stored in drive memory, default parameters loaded
n13*	Expansion card	Expansion card not functioning correctly
n14	SinCos feedback	Sine encoder "wake & shake mode", ends if drive is enabled and wake & shake is done.
n15	Table error	Velocity current table INXMODE 35 error
n16-n31	Reserved	Reserved
n32	Firmware beta version	The firmware is an unreleased beta version
A	Reset	RESET is active at DIGITAL IN x

**\* These warning messages lead to a controlled shut-down of the drive (braking with the emergency ramp)**

## Removing Faults & Warnings

### NOTE

**Table 22** on page 38 should be regarded as a “First-aid” box. Depending on the conditions in your installation, there may be a wide variety of reasons for the fault. In multi-axis systems there may be hidden causes of a fault. Customer service can give you further assistance with problems.

**Table 22:** Gantry Rotation Servo Faults/Warning Removing

Fault	Possible Cause	Measures to remove the cause of the faults
HMI message: Communication fault	<ul style="list-style-type: none"> <li>—Wrong cable used</li> <li>—Cable plugged into wrong position in servo amplifier or PC</li> <li>—Wrong PC interface selected</li> </ul>	<ul style="list-style-type: none"> <li>—Use null-modem cable</li> <li>—Plug cable into the correct sockets on the servo amplifier and PC</li> <li>—Select correct interface</li> </ul>
F01 message: heat sink temperature	<ul style="list-style-type: none"> <li>—Permissible heat sink temperature exceeded</li> </ul>	<ul style="list-style-type: none"> <li>—Improve ventilation</li> </ul>
F02 message: overvoltage	<ul style="list-style-type: none"> <li>— Regen power is insufficient. regen power limit was reached and the regen resistor was switched off. This causes excessive voltage in the DC-link circuit.</li> <li>— Supply voltage too high</li> </ul>	<ul style="list-style-type: none"> <li>—Shorten the braking time RAMP or use an external regen resistor with a higher power rating and adjust the regen power parameter</li> <li>— Use mains transformer</li> </ul>
F04 message: feedback unit	<ul style="list-style-type: none"> <li>— Feedback connector not properly inserted</li> <li>— Feedback cable is broken, crushed or otherwise damaged</li> </ul>	<ul style="list-style-type: none"> <li>—Check connector</li> <li>—Check cable</li> </ul>
F05 message: under-voltage	<ul style="list-style-type: none"> <li>— Supply voltage not present or too low when servo amplifier is enabled</li> </ul>	<ul style="list-style-type: none"> <li>— Only enable the servo amplifier when the mains supply voltage has been switched on delay &gt; 500 ms</li> </ul>
F06 message: motor temperature	<ul style="list-style-type: none"> <li>— Motor thermostat has been activated</li> <li>— Feedback connector is loose or break in feedback cable</li> </ul>	<ul style="list-style-type: none"> <li>— Wait until motor has cooled down, then check why it became so hot</li> <li>— Tighten connector or use new feedback cable</li> </ul>
F07 message: aux. voltage	<ul style="list-style-type: none"> <li>— The aux. voltage produced by the servo amplifier is incorrect</li> </ul>	<ul style="list-style-type: none"> <li>— Return the servo amplifier to the manufacturer for repair</li> </ul>
F08 message: motor runs away (overspeed)	<ul style="list-style-type: none"> <li>— Motor phases swapped</li> <li>— Feedback set up incorrectly</li> </ul>	<ul style="list-style-type: none"> <li>— Correct motor phase sequence</li> <li>— Set up correct offset angle</li> </ul>

**Table 22: Gantry Rotation Servo Faults/Warning Removing**

<b>Fault</b>	<b>Possible Cause</b>	<b>Measures to remove the cause of the faults</b>
F11 message: brake	<ul style="list-style-type: none"> <li>— Short-circuit in the supply cable for the motor-holding brake</li> <li>— Motor-holding brake is faulty</li> <li>— Fault in brake cable</li> <li>— No brake connected, although the brake parameter is set to "WITH"</li> </ul>	<ul style="list-style-type: none"> <li>— Remove short-circuit</li> <li>— Replace motor</li> <li>— Check shielding of brake cable</li> <li>— Brake parameter set to "WITHOUT"</li> </ul>
F13 message: internal temperature	<ul style="list-style-type: none"> <li>— Permissible internal temperature exceeded</li> </ul>	<ul style="list-style-type: none"> <li>— Improve ventilation</li> </ul>
F14 message: output stage fault	<ul style="list-style-type: none"> <li>— Motor cable has short-circuit/ground short</li> <li>— Motor has short-circuit / ground short</li> <li>— Output module is overheated</li> <li>— Output stage is faulty</li> <li>— Short-circuit / short to ground in the external regen resistor</li> </ul>	<ul style="list-style-type: none"> <li>— Replace cable</li> <li>— Replace motor</li> <li>— Improve ventilation</li> <li>— Return the servo amplifier to the manufacturer for repair</li> <li>— Remove short-circuit / ground short</li> </ul>
F16 message: mains BTB/RTO	<ul style="list-style-type: none"> <li>— Enable was applied, although the supply voltage was not present.</li> <li>— At least 2 supply phases are missing</li> </ul>	<ul style="list-style-type: none"> <li>— Only enable the servo amplifier when the mains supply voltage has been switched on</li> <li>— Check electrical supply</li> </ul>
F17 message: A/D converter	<ul style="list-style-type: none"> <li>— Error in the analog-digital conversion, usually caused by excessive EMI</li> </ul>	<ul style="list-style-type: none"> <li>— Reduce EMI, check screening and grounding</li> </ul>
F25 message: Commutation error	<ul style="list-style-type: none"> <li>— Wrong cable</li> <li>— Wrong phasing</li> </ul>	<ul style="list-style-type: none"> <li>— Check wiring</li> <li>— Check resolver poles (RESPOLES)</li> <li>Check motor poles (MPOLES)</li> <li>Check offset (MPHASE)</li> </ul>
F27 message: error AS-option	<ul style="list-style-type: none"> <li>— -AS-24V relay AND hardware enable AND software enable are active</li> </ul>	<ul style="list-style-type: none"> <li>— Check PLC programming and wiring</li> </ul>

**Table 22:** Gantry Rotation Servo Faults/Warning Removing

Fault	Possible Cause	Measures to remove the cause of the faults
motor does not rotate	<ul style="list-style-type: none"> <li>— Servo amplifier not enabled</li> <li>— Break in setpoint cable</li> <li>— Motor phases swapped</li> <li>— Brake not released</li> <li>— Drive is mechanically blocked</li> <li>— No. of motor poles set incorrectly</li> <li>— Feedback set up incorrectly</li> </ul>	<ul style="list-style-type: none"> <li>— Apply enable signal</li> <li>— Check setpoint cable</li> <li>— Correct motor phase sequence</li> <li>— Check brake control</li> <li>— Check mechanism</li> <li>— Set no. of motor poles</li> <li>— Set up feedback correctly</li> </ul>
motor oscillates	<ul style="list-style-type: none"> <li>— Gain too high (speed controller)</li> <li>— Shielding in feedback cable has a break</li> <li>— AGND not wired up</li> </ul>	<ul style="list-style-type: none"> <li>— Reduce Kp (speed controller)</li> <li>— Replace feedback cable</li> <li>— Join AGND to CNC-GND</li> </ul>
drive reports following error	<ul style="list-style-type: none"> <li>— <math>I_{rms}</math> or <math>I_{peak}</math> is set to low</li> <li>— Setpoint ramp is too long</li> </ul>	<ul style="list-style-type: none"> <li>— Increase <math>I_{rms}</math> or <math>I_{peak}</math> (keep within motor data )</li> <li>— Shorten setpoint ramp +/-</li> </ul>
motor overheating	<ul style="list-style-type: none"> <li>— <math>I_{rms}</math> / <math>I_{peak}</math> set too high</li> </ul>	<ul style="list-style-type: none"> <li>— Reduce <math>I_{rms}</math> / <math>I_{peak}</math></li> </ul>
drive too soft	<ul style="list-style-type: none"> <li>— Kp (speed controller) too low</li> <li>— Tn (speed controller) too high</li> <li>— PID-T2 too high</li> <li>— T-Tacho too high</li> </ul>	<ul style="list-style-type: none"> <li>— Increase Kp (speed controller)</li> <li>— Use motor default value for Tn (speed controller)</li> <li>— Reduce PID-T2</li> <li>— Reduce T-Tacho</li> </ul>
drive runs roughly	<ul style="list-style-type: none"> <li>— Kp (speed controller) too high</li> <li>— Tn (speed controller) too low</li> <li>— PID-T2 too low</li> <li>— T-Tacho too low</li> </ul>	<ul style="list-style-type: none"> <li>— Reduce Kp (speed controller)</li> <li>— Use motor default value for Tn (speed controller)</li> <li>— Increase PID-T2</li> <li>— Increase T-Tacho</li> </ul>
axis drifts at setpoint = 0V	<ul style="list-style-type: none"> <li>— Offset not correctly adjusted for analog setpoint provision</li> <li>— AGND not joined to the CNC-GND of the controls</li> </ul>	<ul style="list-style-type: none"> <li>— Adjust setpoint-offset (analog I/O)</li> <li>— Join AGND and CNC-GND</li> </ul>
n12 message: Motor default values loaded	<ul style="list-style-type: none"> <li>— Motor number stored in sine encoders EEPROM different than what drive configured for</li> </ul>	<ul style="list-style-type: none"> <li>— If n12 is displayed, default values for the motor are loaded. Motor number will be automatically stored in EEPROM with SAVE.</li> </ul>

**Table 22:** Gantry Rotation Servo Faults/Warning Removing

Fault	Possible Cause	Measures to remove the cause of the faults
n14 message: Wake & shake active	— Wake & shake not executed	— Enable the drive



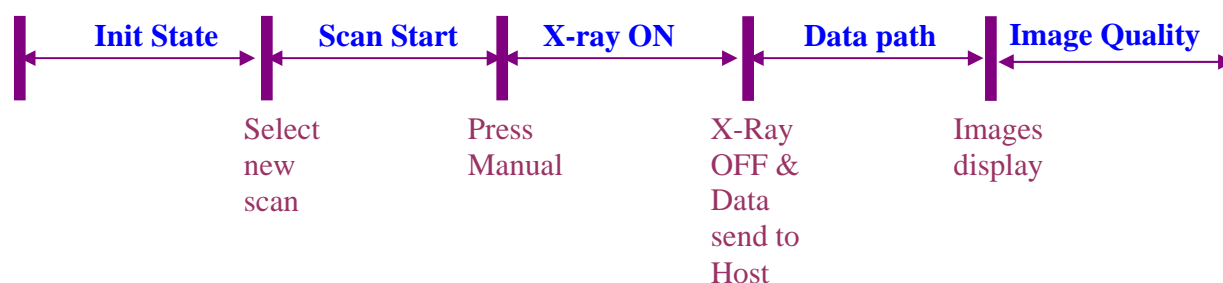
# System Trouble Shooting Flow Chart

## FlowChart overview

There are several troubleshooting procedures based on CT Scanner System process starting with Initialization and ending when the images are displayed on the monitor.

Use the relevant troubleshooting procedure according to the stage when the system fails.

The CT Scanner System Process



**Figure 12: CT Scanner System Process**

The Troubleshooting Procedures are:

- [Initial State](#) on page 43
- [Scan Start](#) on page 44
- [Recommended Solutions for Hardware Prepare Error](#) on page 47
- [X-Ray On](#) on page 56
- [HV Trouble Shooting](#) on page 58
- [Data Path](#) on page 85
- [Image Quality Troubleshooting](#) on page 91
- [Follow HTML on Error log Viewer](#) on page 92
- [Error Code Description in System Log](#) on page 93

# Initial State

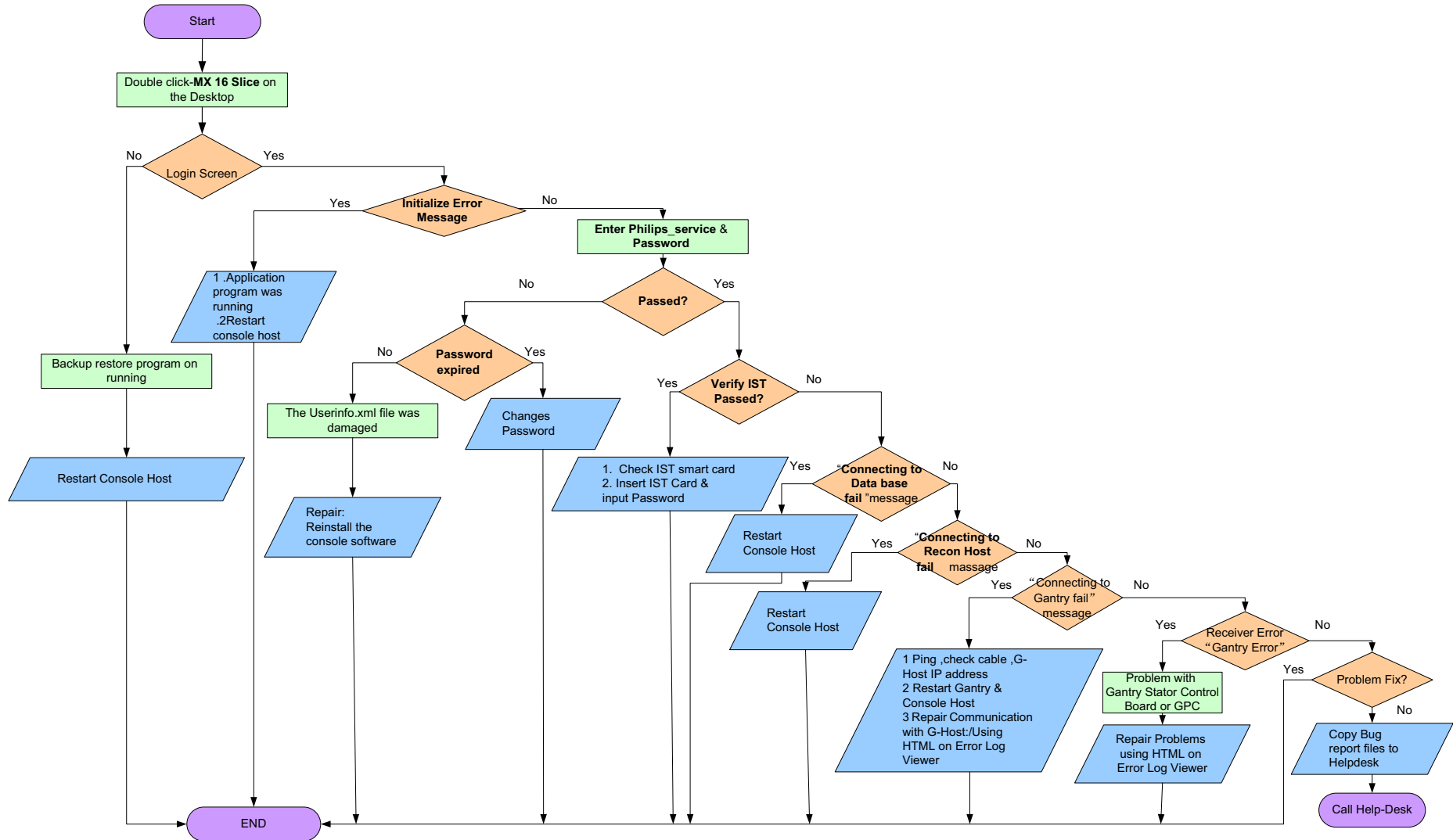
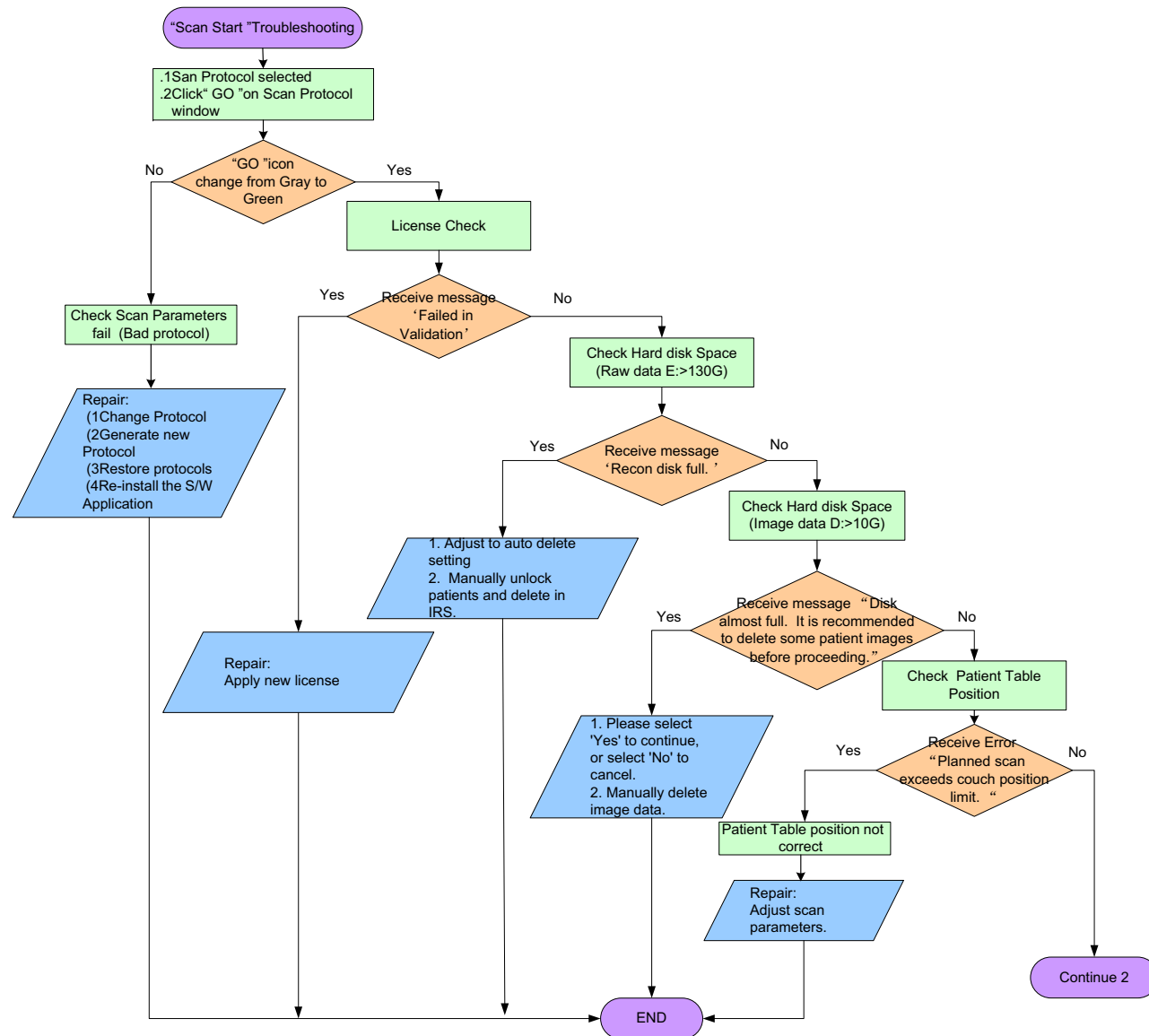


Figure 13: Initial State Troubleshooting Process

# Scan Start

The Scan Start troubleshooting covers the problems that occur after selecting scan protocol and until the state when the **Press manual** command pops up on the screen.



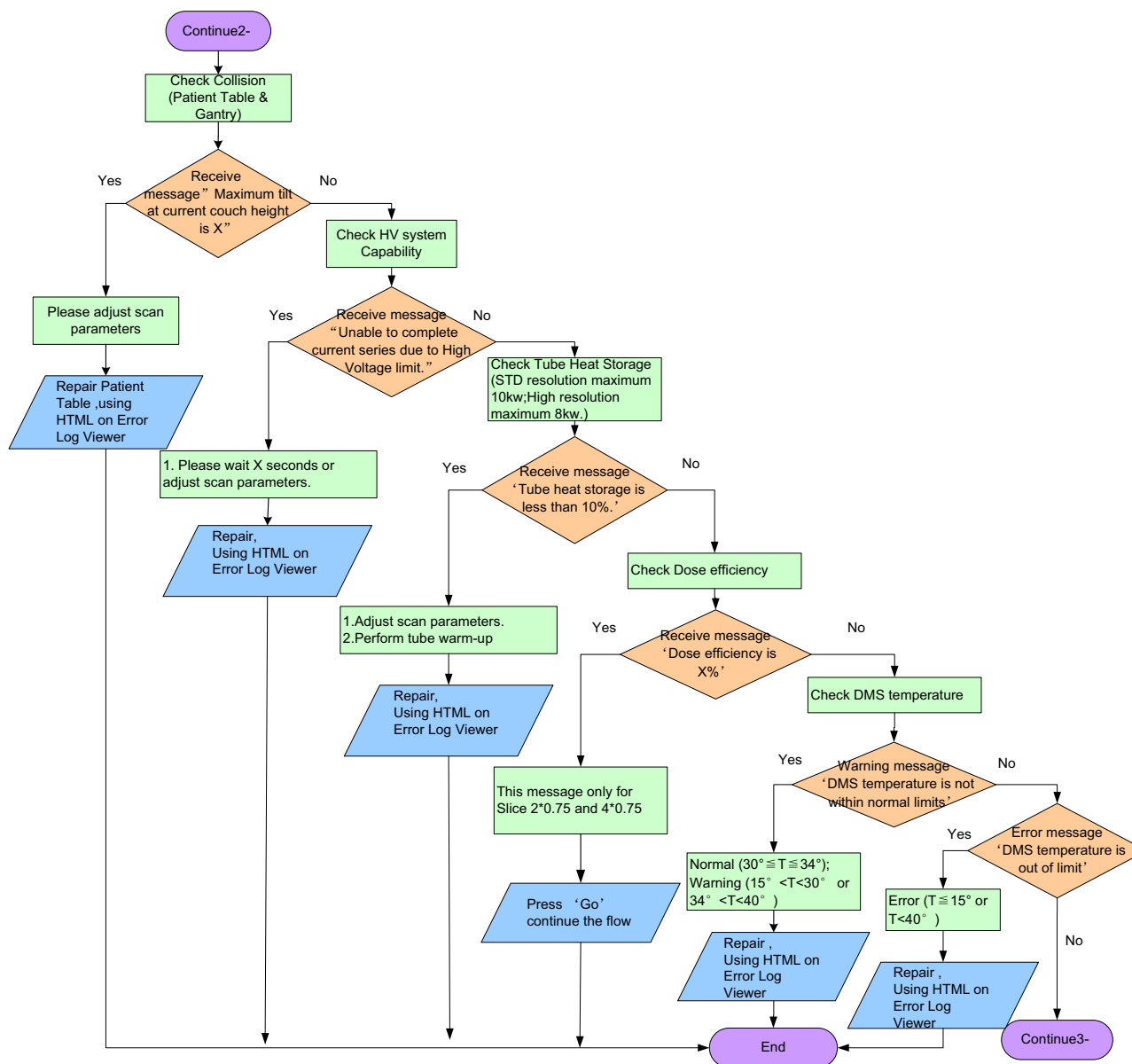


Figure 14: Scan Start continued

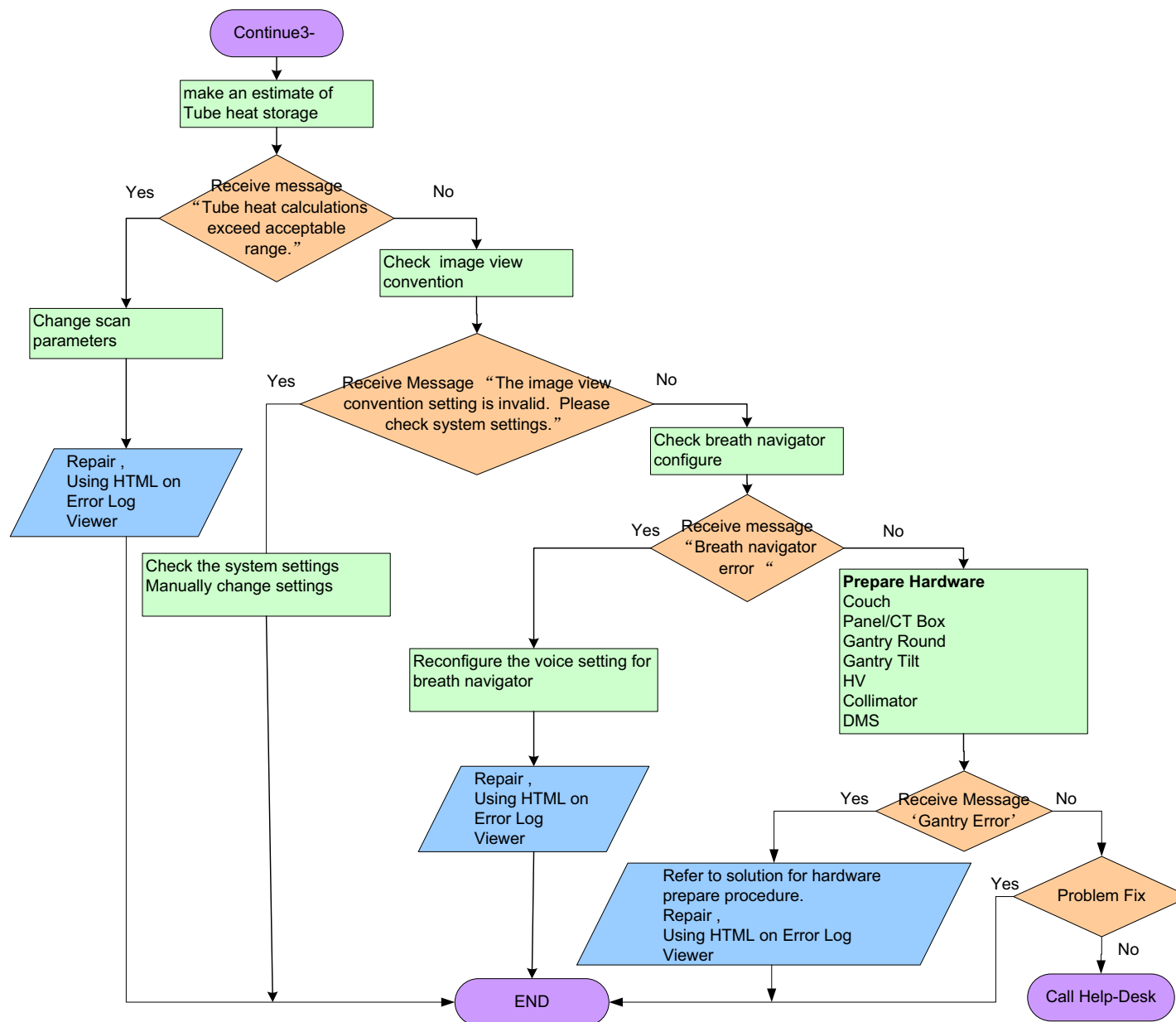
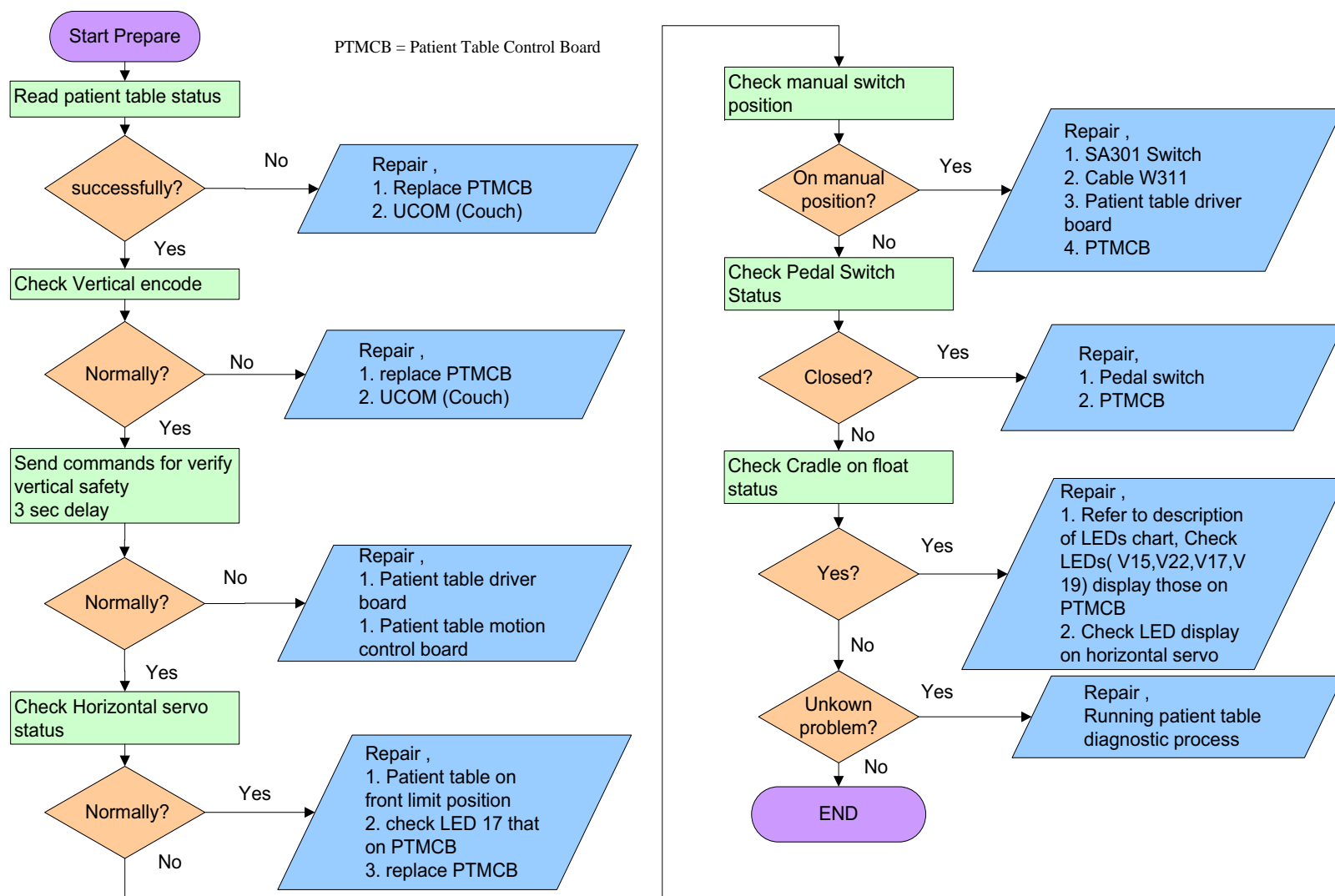


Figure 15: Scan Start Continued

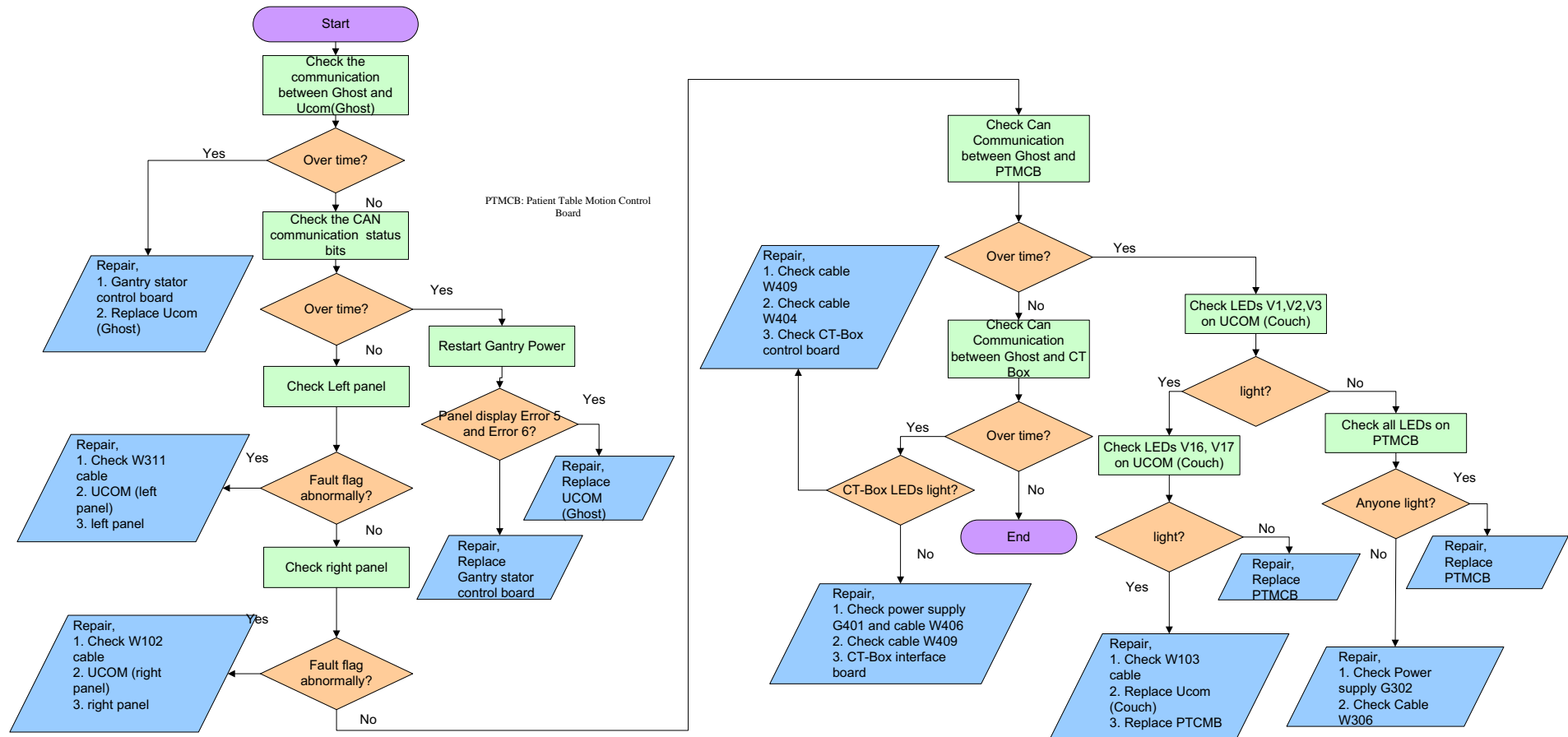
## Recommended Solutions for Hardware Prepare Error

- [For Patient Table Prepare Error](#) on page 48
- [For Panel & CTBOX Prepare Error](#) on page 49
- [For Gantry Rotation Prepare Error](#) on page 50
- [For Gantry Tilt Prepare Error](#) on page 51
- [HV Prepare Error](#) on page 52
- [Collimator Prepare Error](#) on page 53
- [DMS Prepare Error](#) on page 55

# For Patient Table Prepare Error

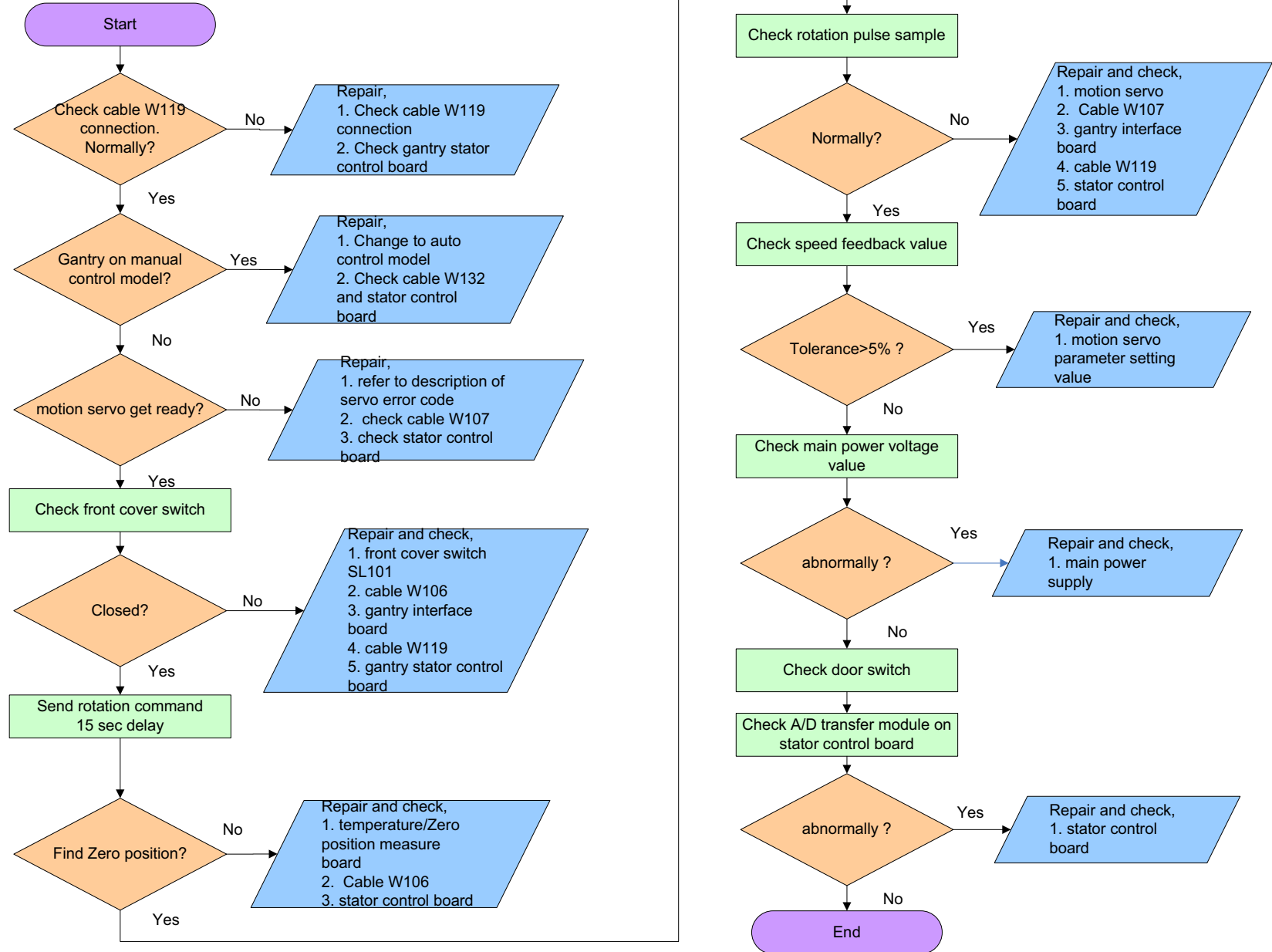


# For Panel & CTBOX Prepare Error

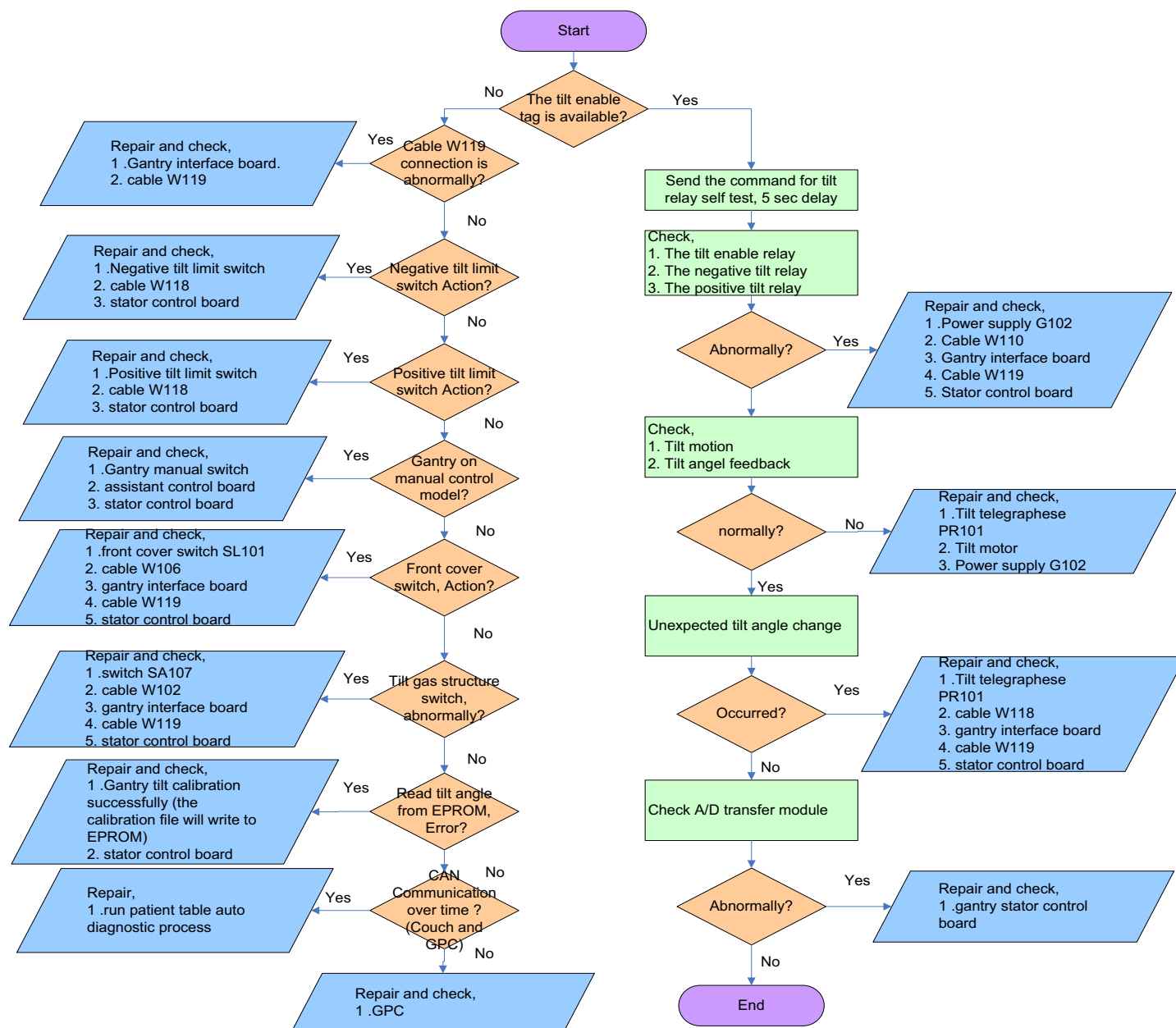




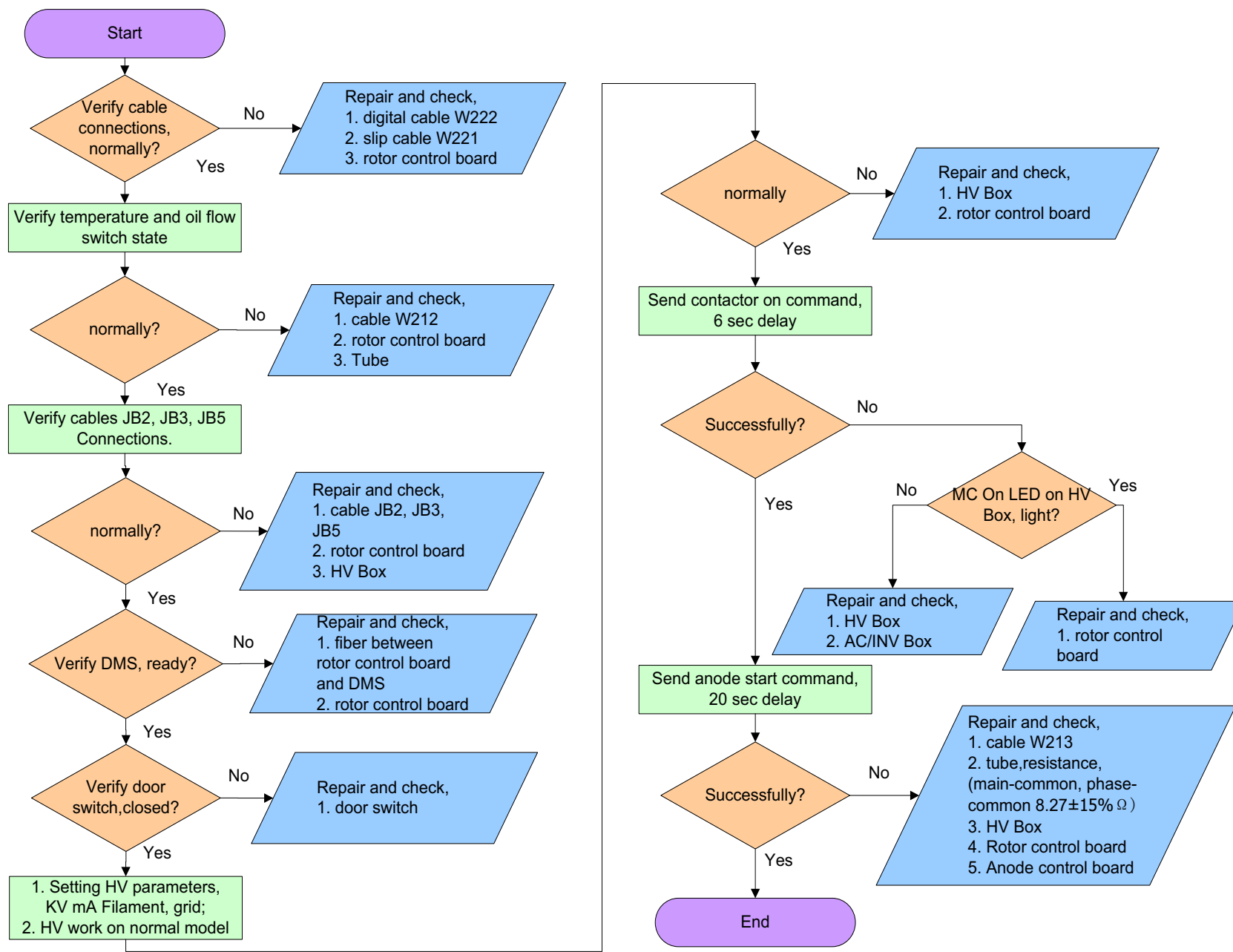
## For Gantry Rotation Prepare Error



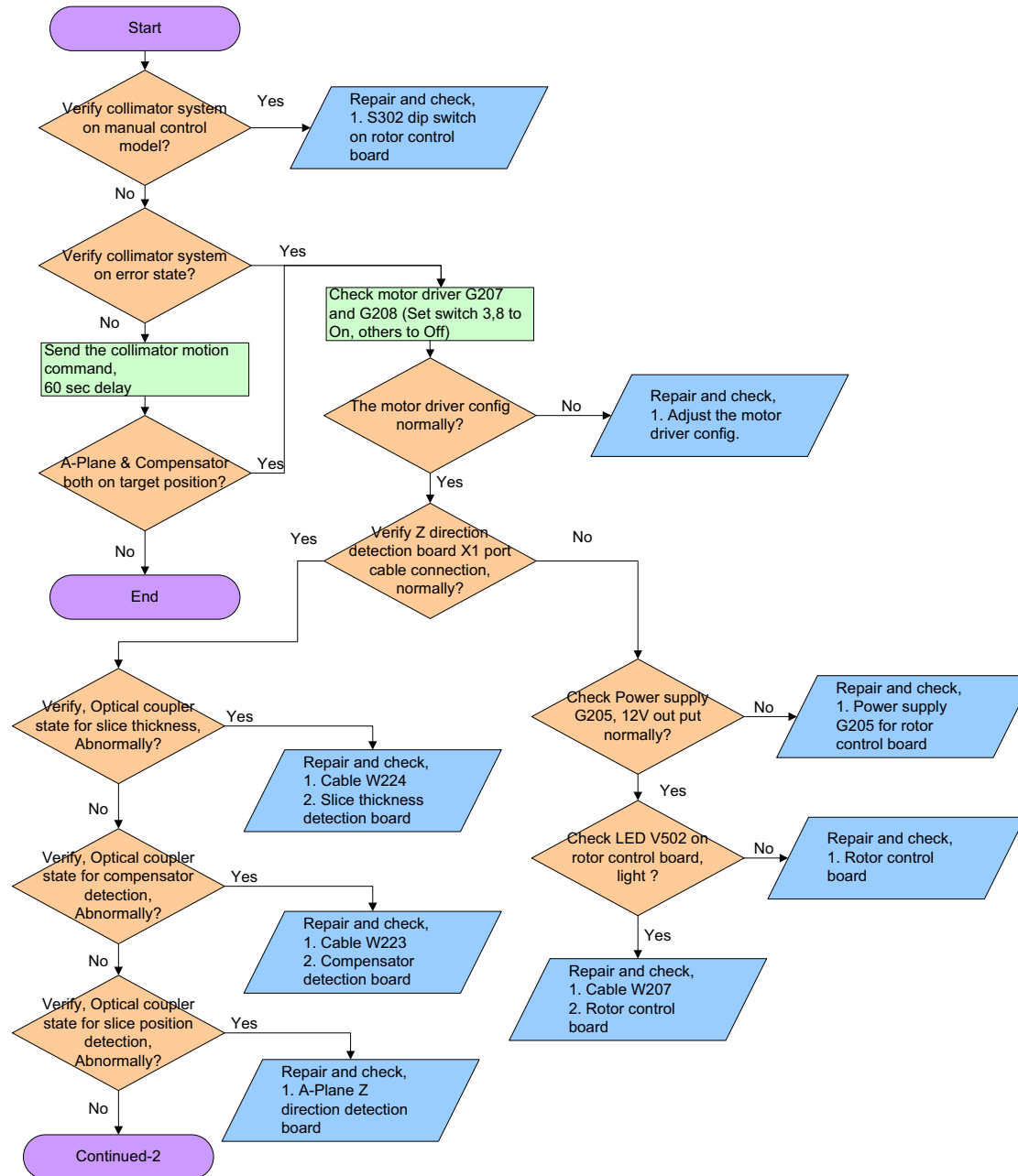
# For Gantry Tilt Prepare Error



# HV Prepare Error



# Collimator Prepare Error



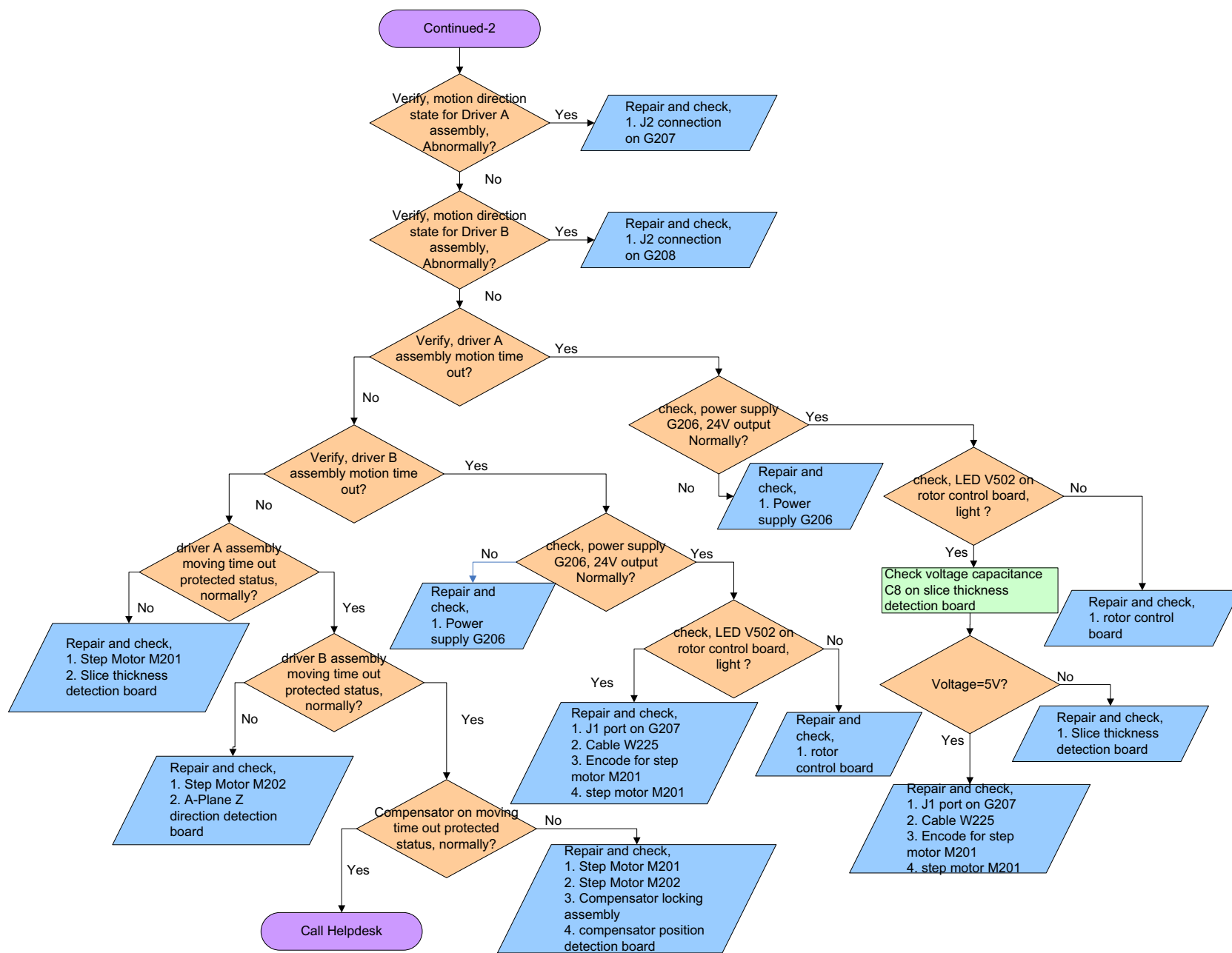
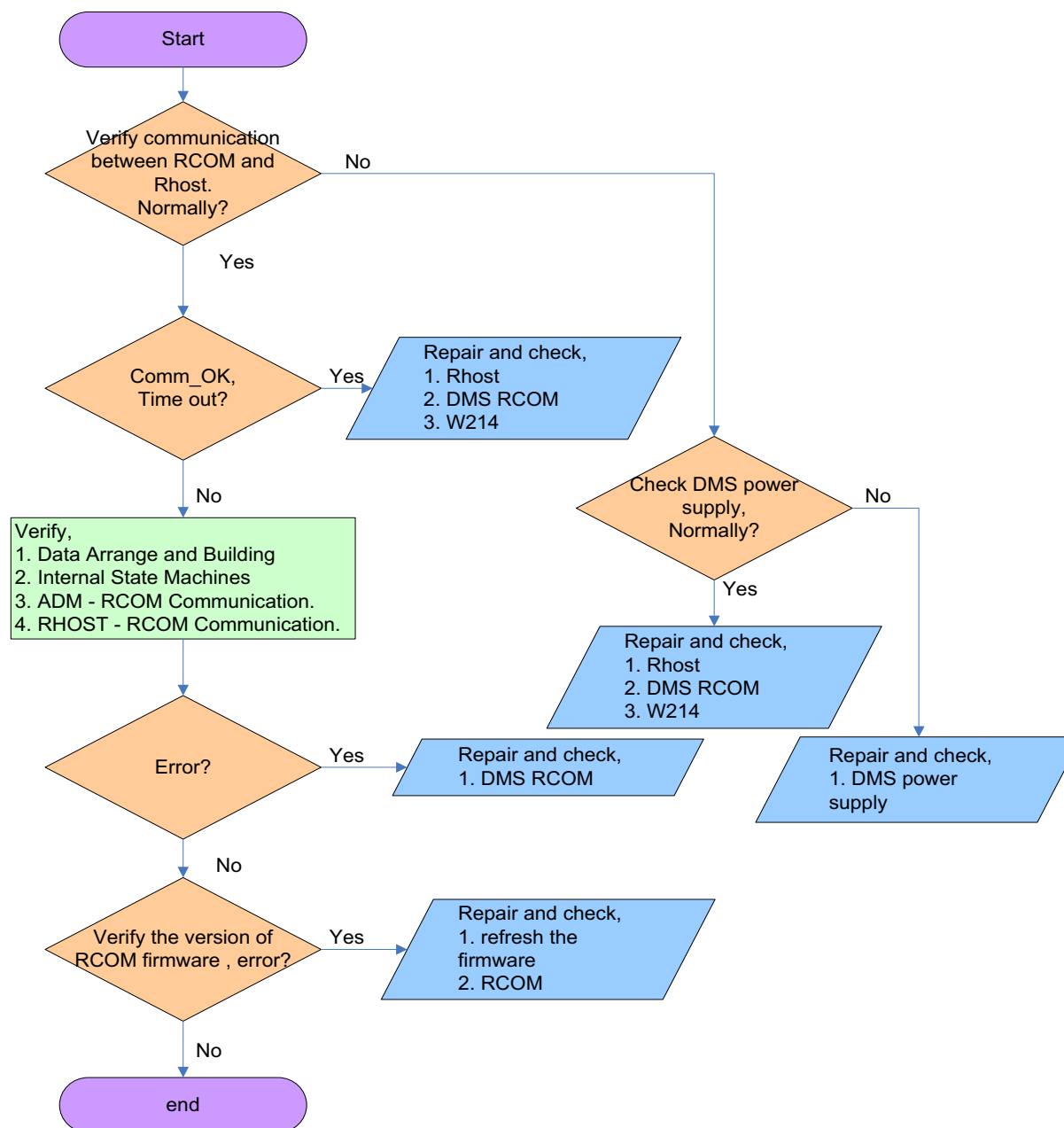


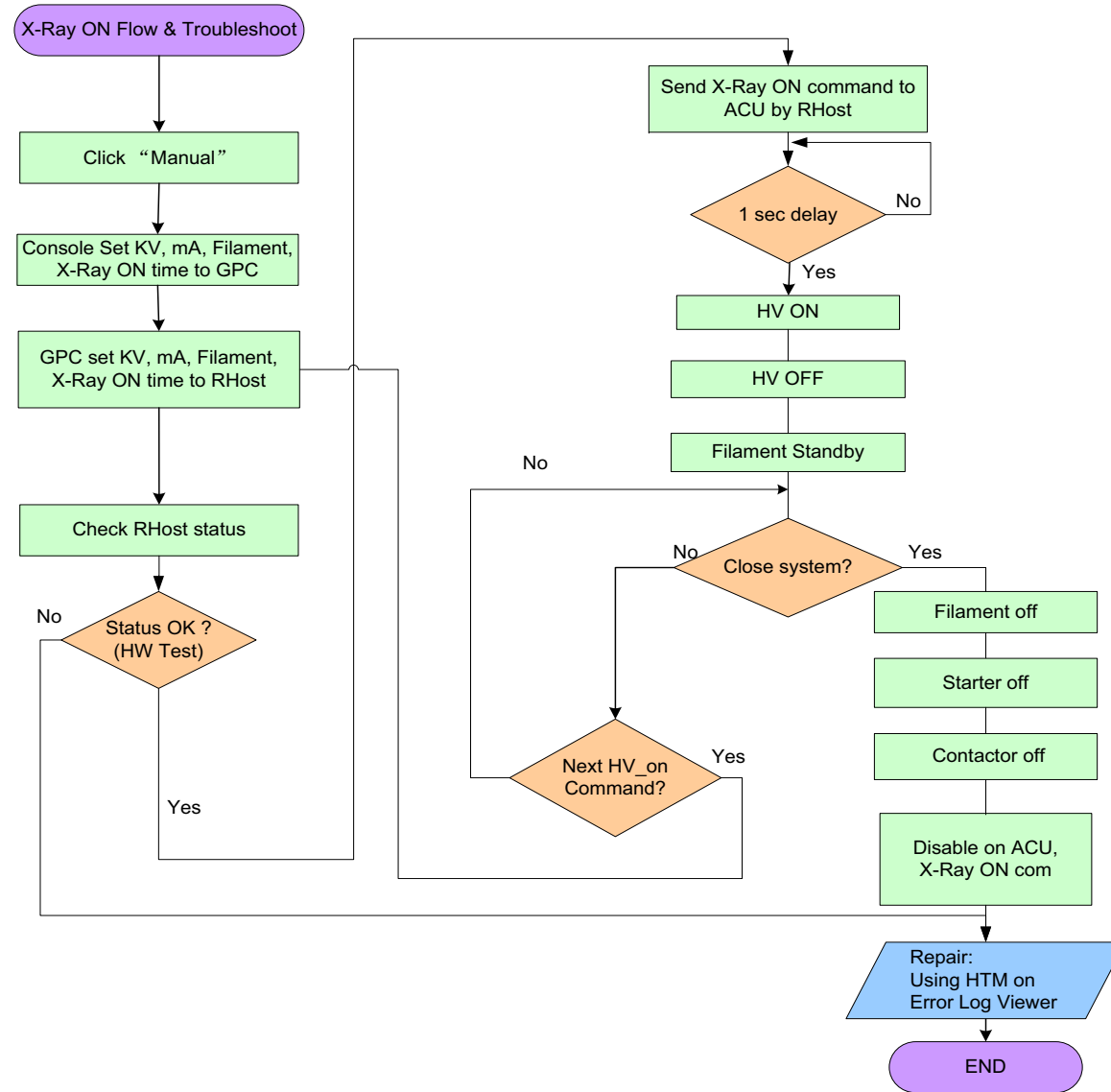
Figure 16: Collimator Prepare Error continued

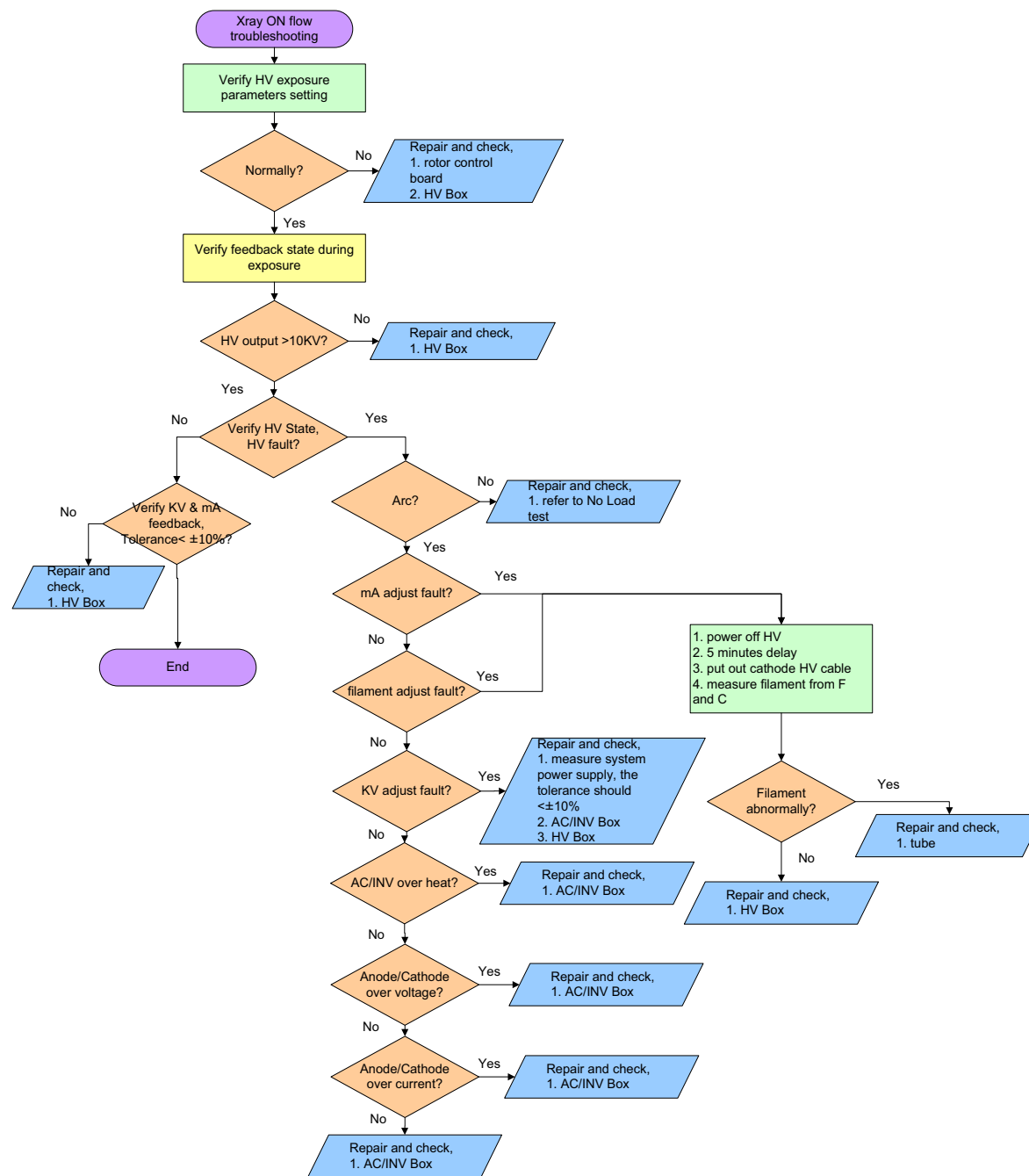
## DMS Prepare Error



# X-Ray On

The purpose of the X-ray ON Troubleshooting procedure is to assist the field engineer to troubleshoot a problem on system starting from the activating Manual Scan (Press for Manual Scan), continuing with X-ray ON exposure, X-ray OFF, and ready for next exposure.







# HV Trouble Shooting

There are two kinds of HV,

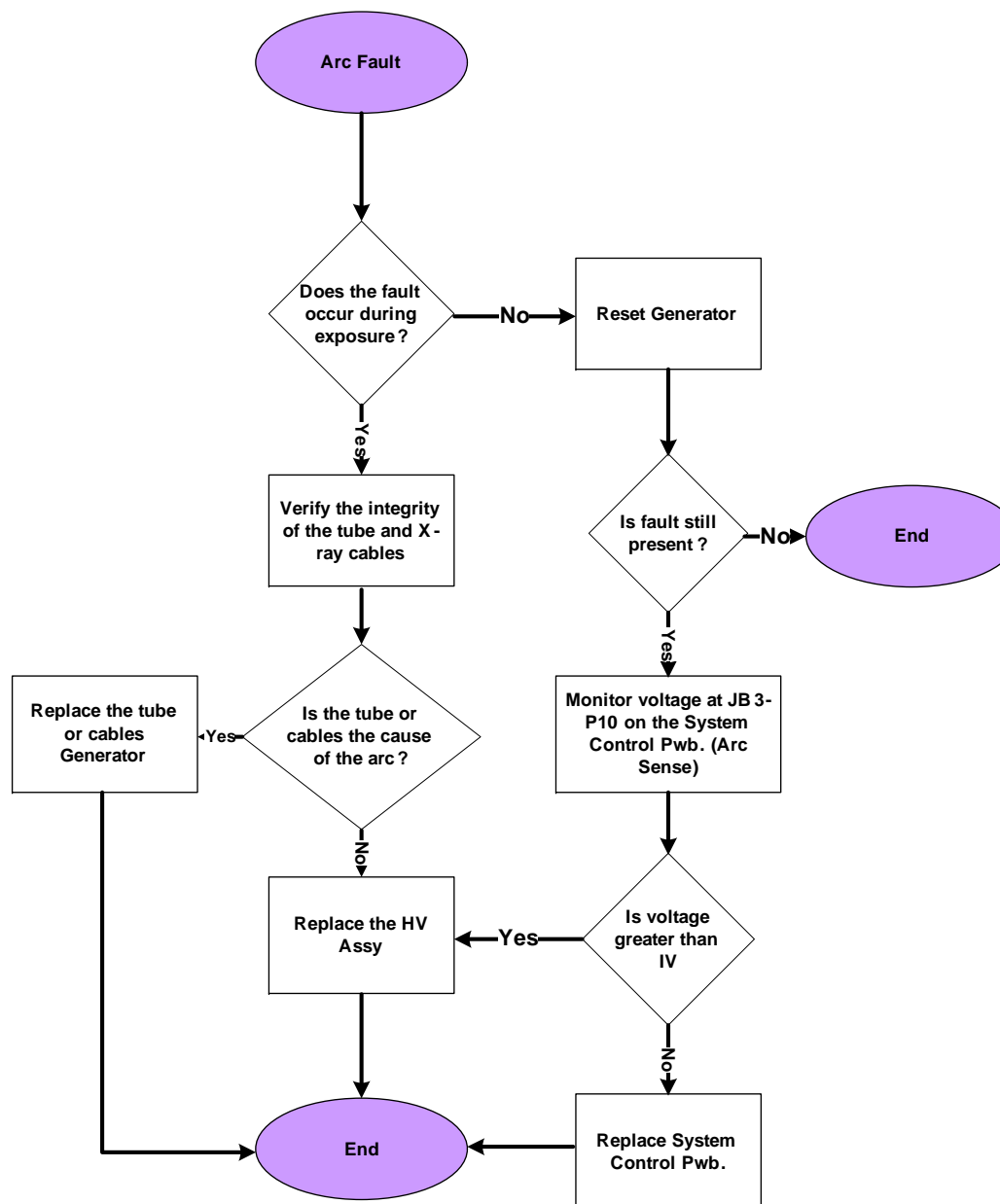
For CHASSIS X3815:

- [ARC Fault \(For CHASSIS X3815\)](#) on page 59
- [Anode Overvoltage \(For CHASSIS X3815\)](#) on page 60
- [Cathode Overvoltage \(For CHASSIS X3815\)](#) on page 61
- [Filament Fault \(For CHASSIS X3815\)](#) on page 62
- [TMP Fault \(For CHASSIS X3815\)](#) on page 63
- [KV REG Error \(For CHASSIS X3815\)](#) on page 64
- [mA REG Error \(For CHASSIS X3815\)](#) on page 66
- [Cathode Overcurrent \(For CHASSIS X3815\)](#) on page 67
- [Starter Error \(For CHASSIS X3815\)](#) on page 68
- [Uncommanded Exposure \(For CHASSIS X3815\)](#) on page 69

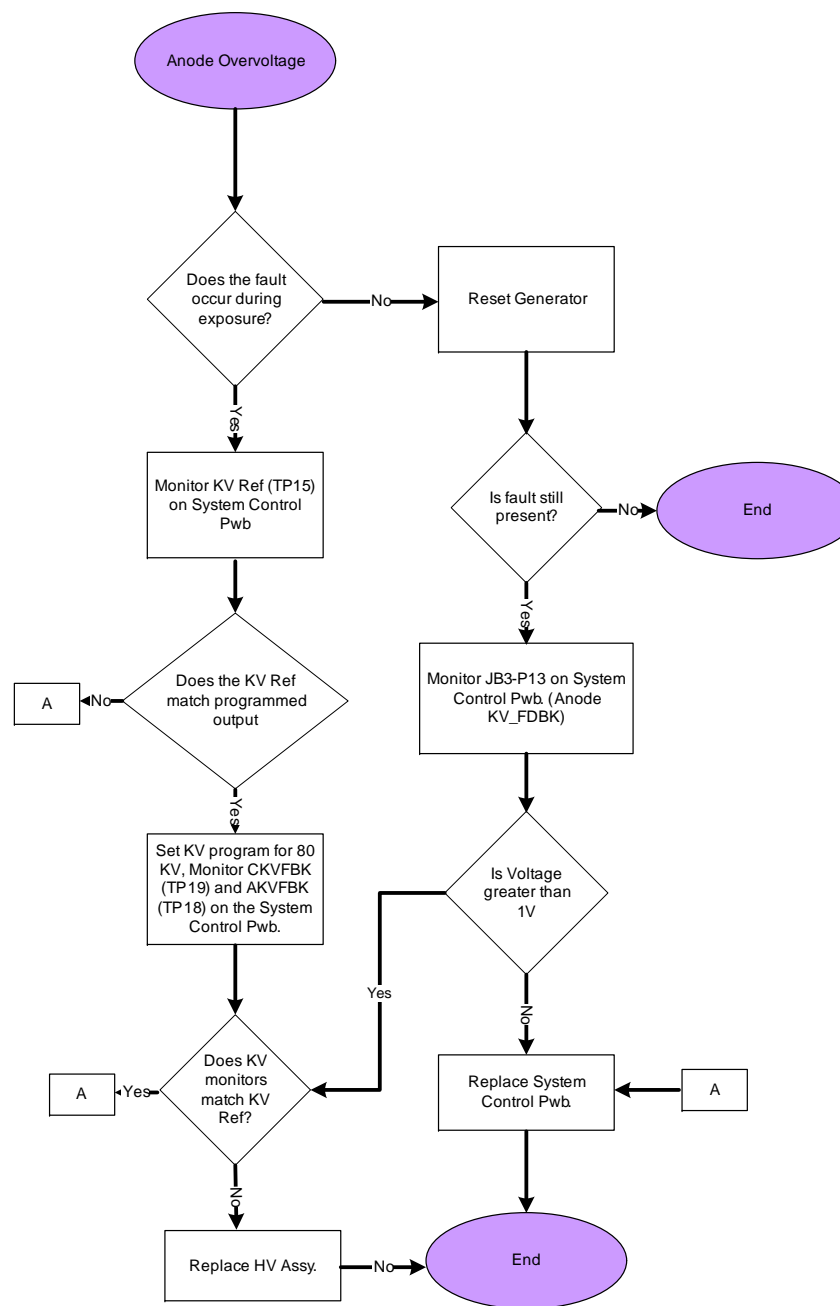
For Fironia-50:

- [Anode Arc Fault \(For Fironia-50\)](#)
- [Cathode Arc Fault \(For Fironia-50\)](#)
- [Arc \(For Fironia-50\)](#)
- [Anode Overvoltage \(For Fironia-50\)](#)
- [Cathode Overvoltage \(For Fironia-50\)](#)
- [Filament fault \(For Fironia-50\)](#)
- [Inv\\_tmp Fault \(For Fironia-50\)](#)
- [KV Reg Error \(For Fironia-50\)](#)
- [mA Reg Error \(For Fironia-50\)](#)
- [Cathode Overcurrent \(For Fironia-50\)](#)
- [Starter Error \(For Fironia-50\)](#)

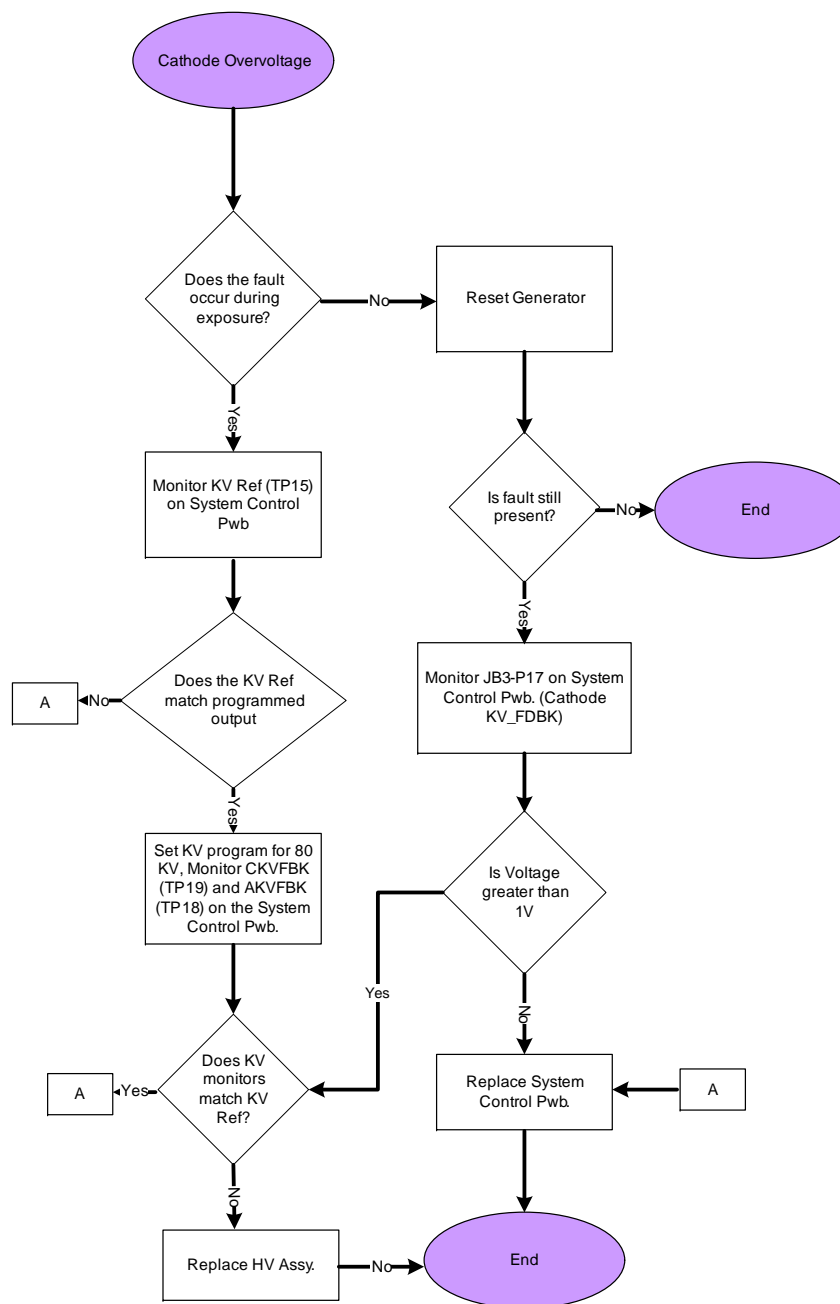
## ARC Fault (For CHASSIS X3815)



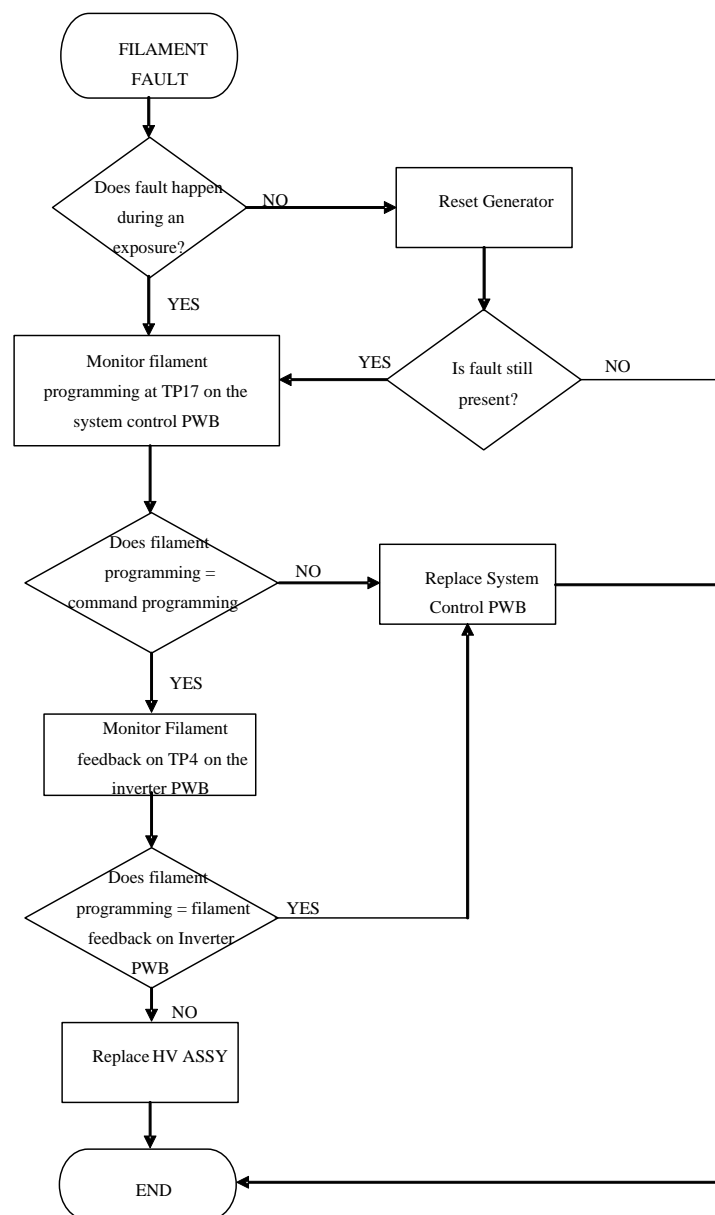
# Anode Overvoltage (For CHASSIS X3815)



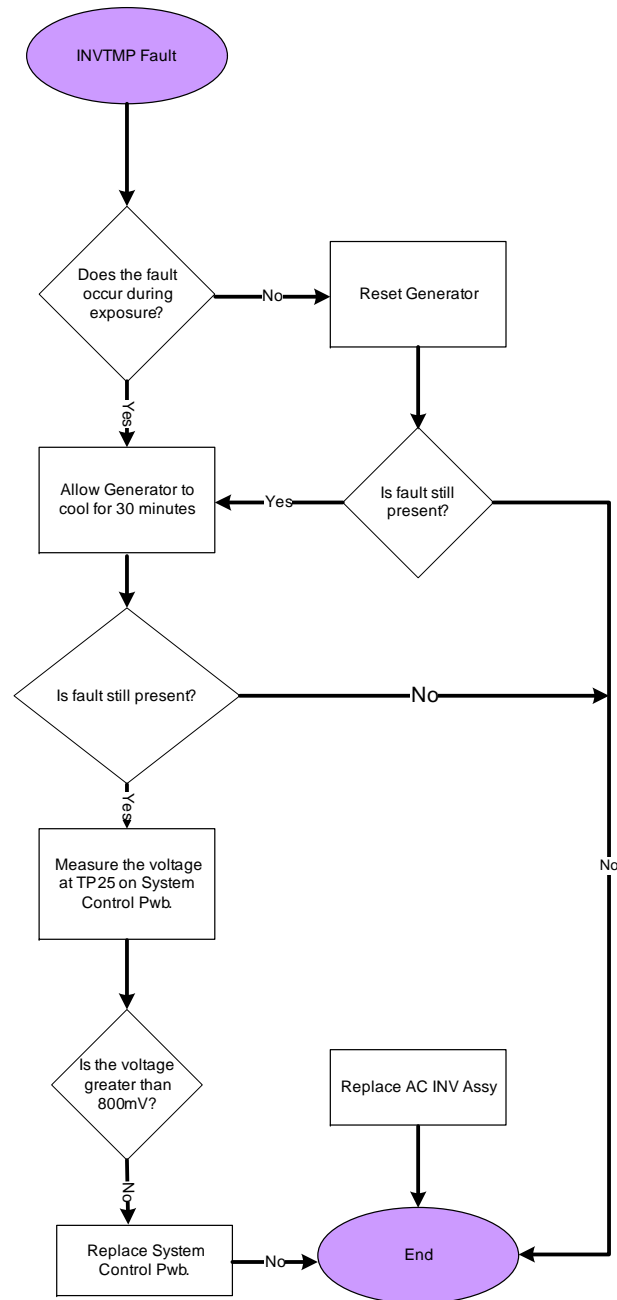
## Cathode Overvoltage (For CHASSIS X3815)



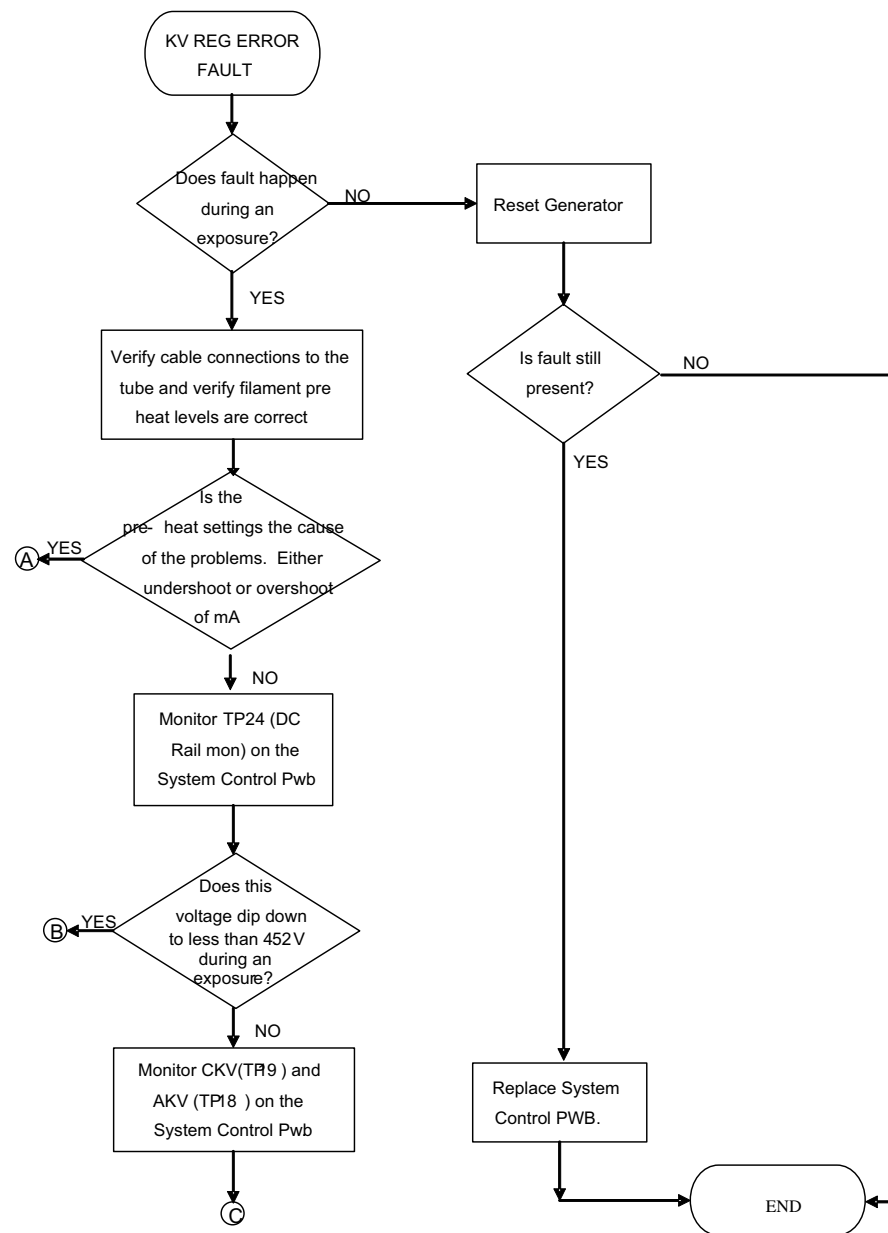
## Filament Fault (For CHASSIS X3815)

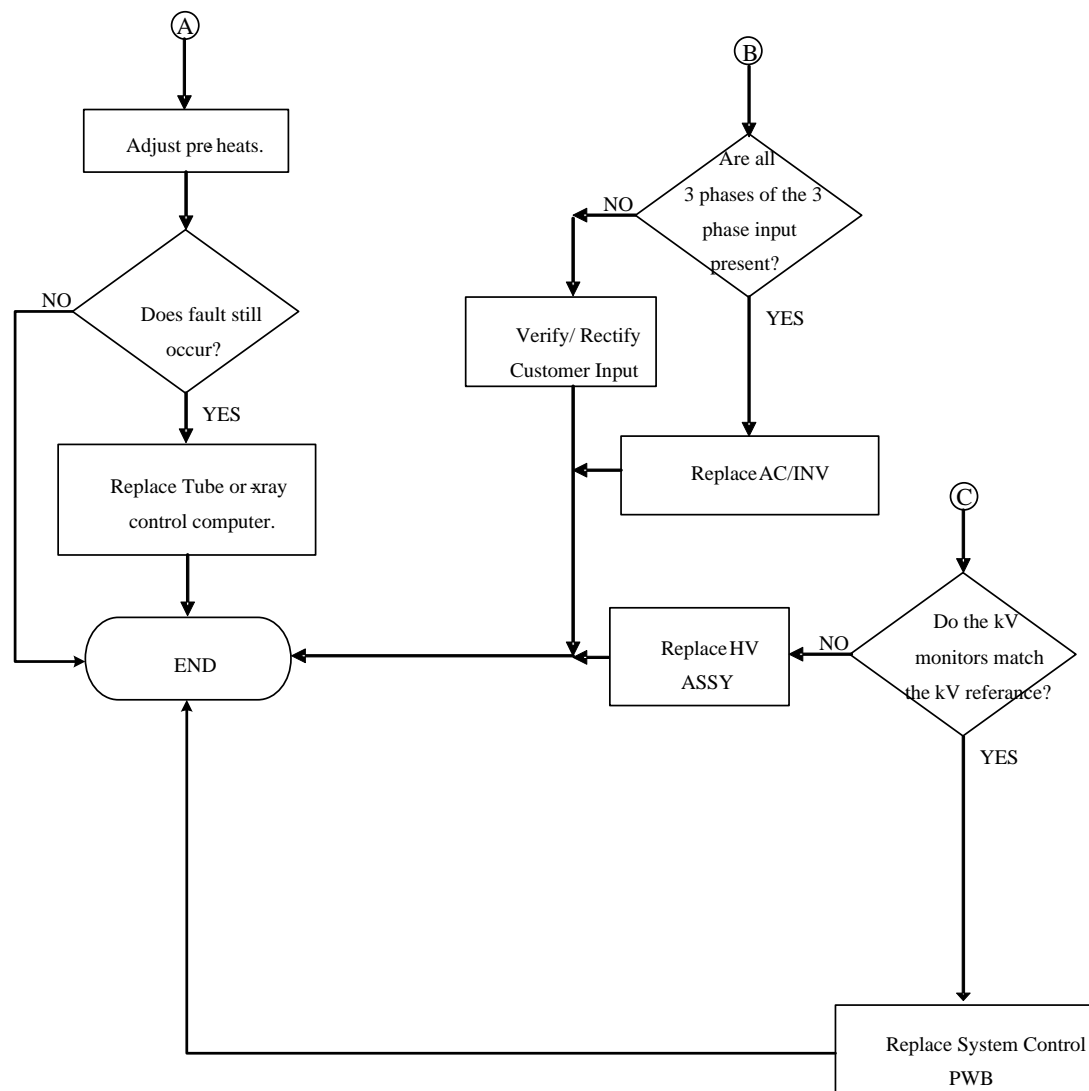


## TMP Fault (For CHASSIS X3815)



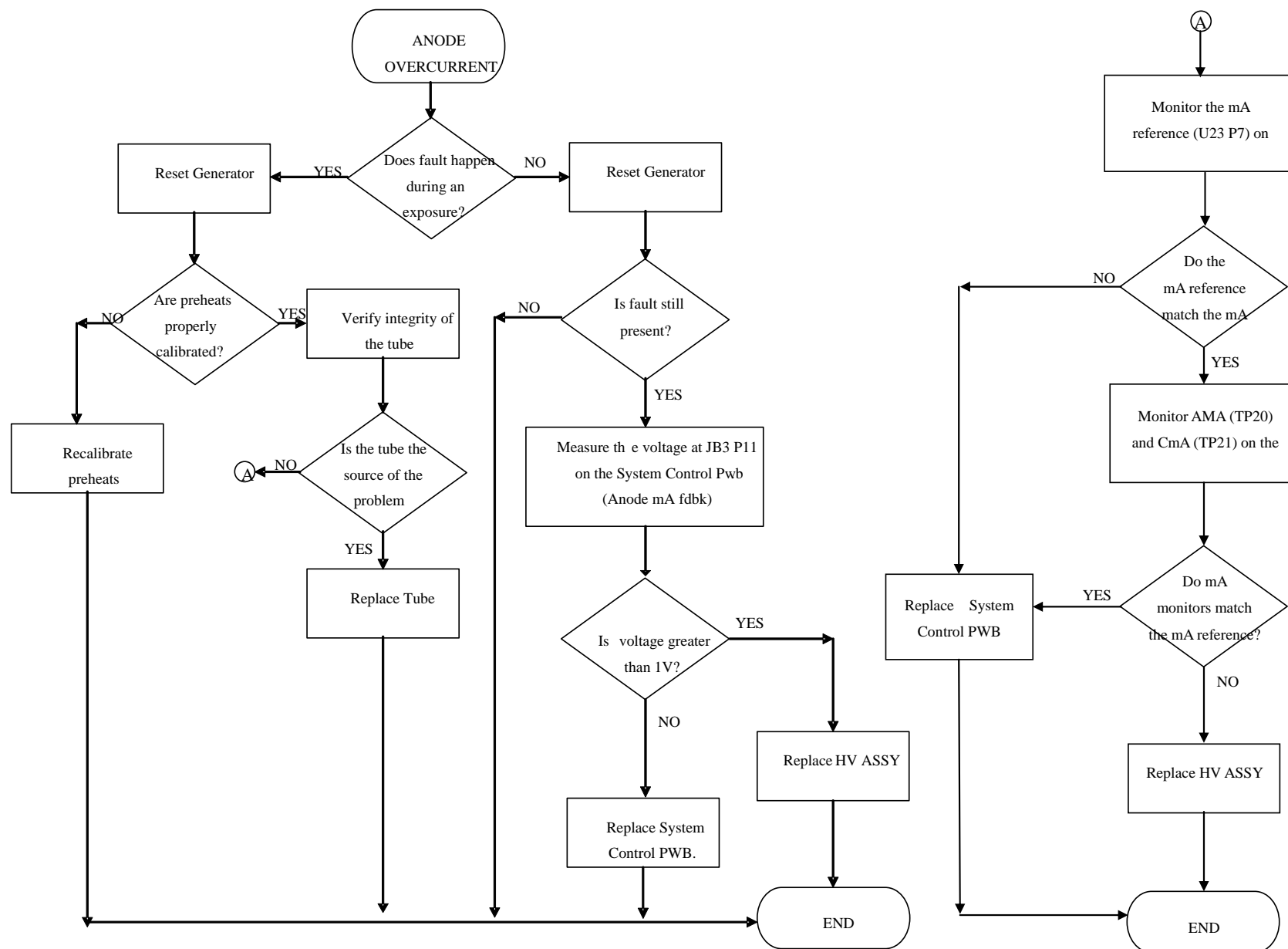
# KV REG Error (For CHASSIS X3815)



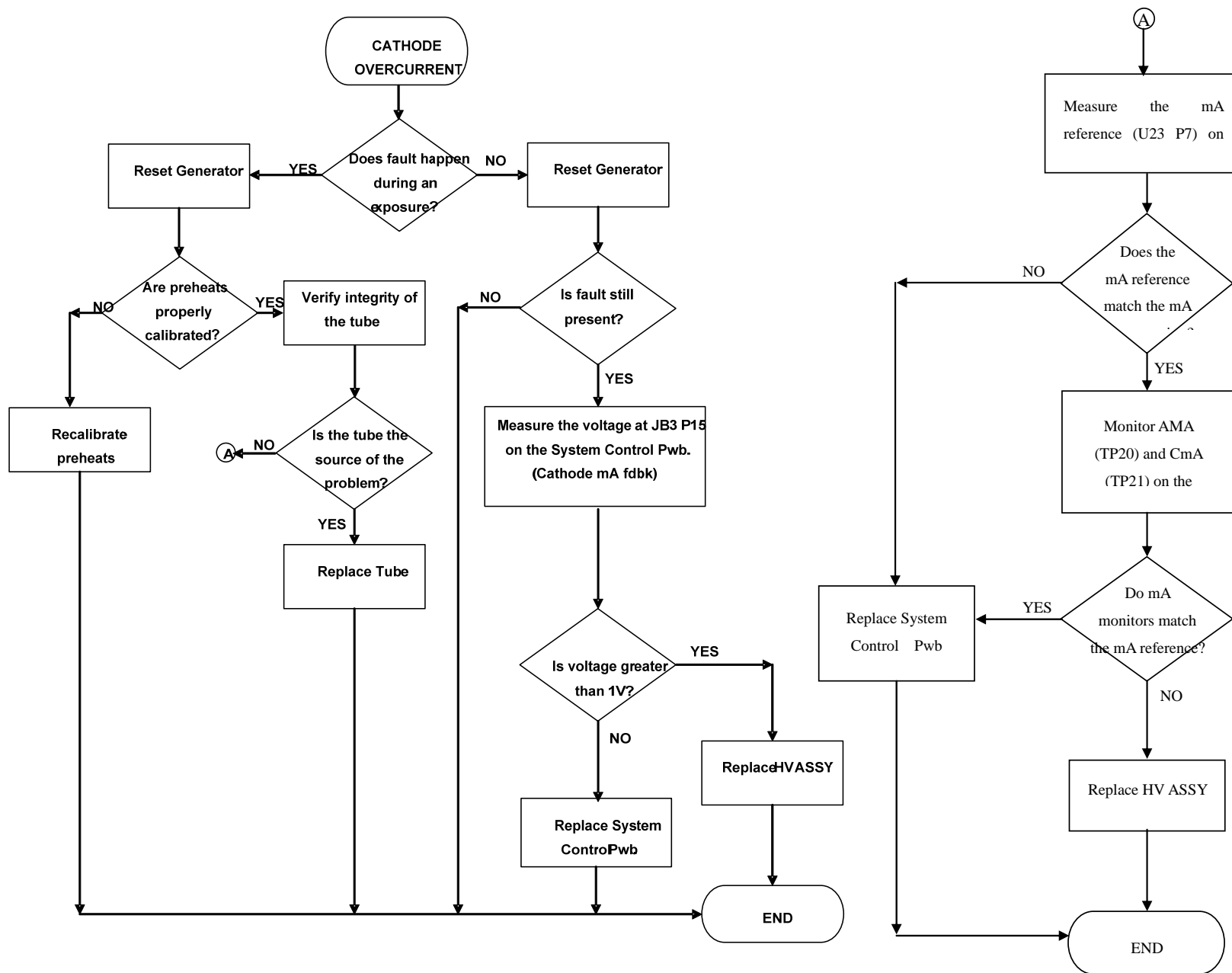




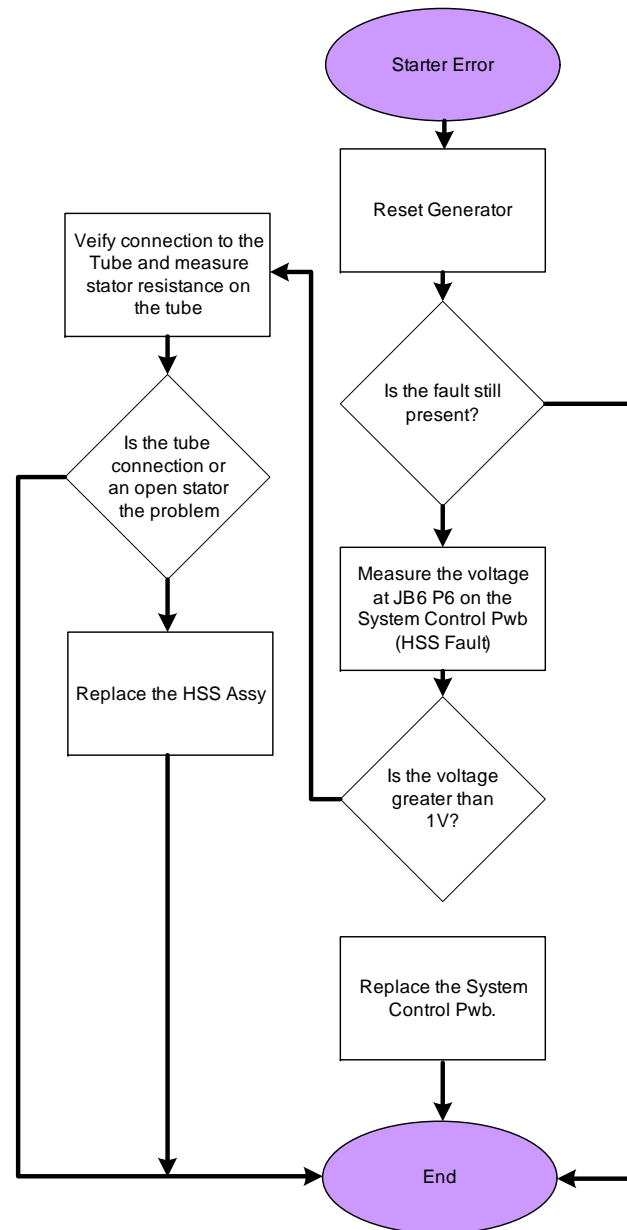
# mA REG Error (For CHASSIS X3815)



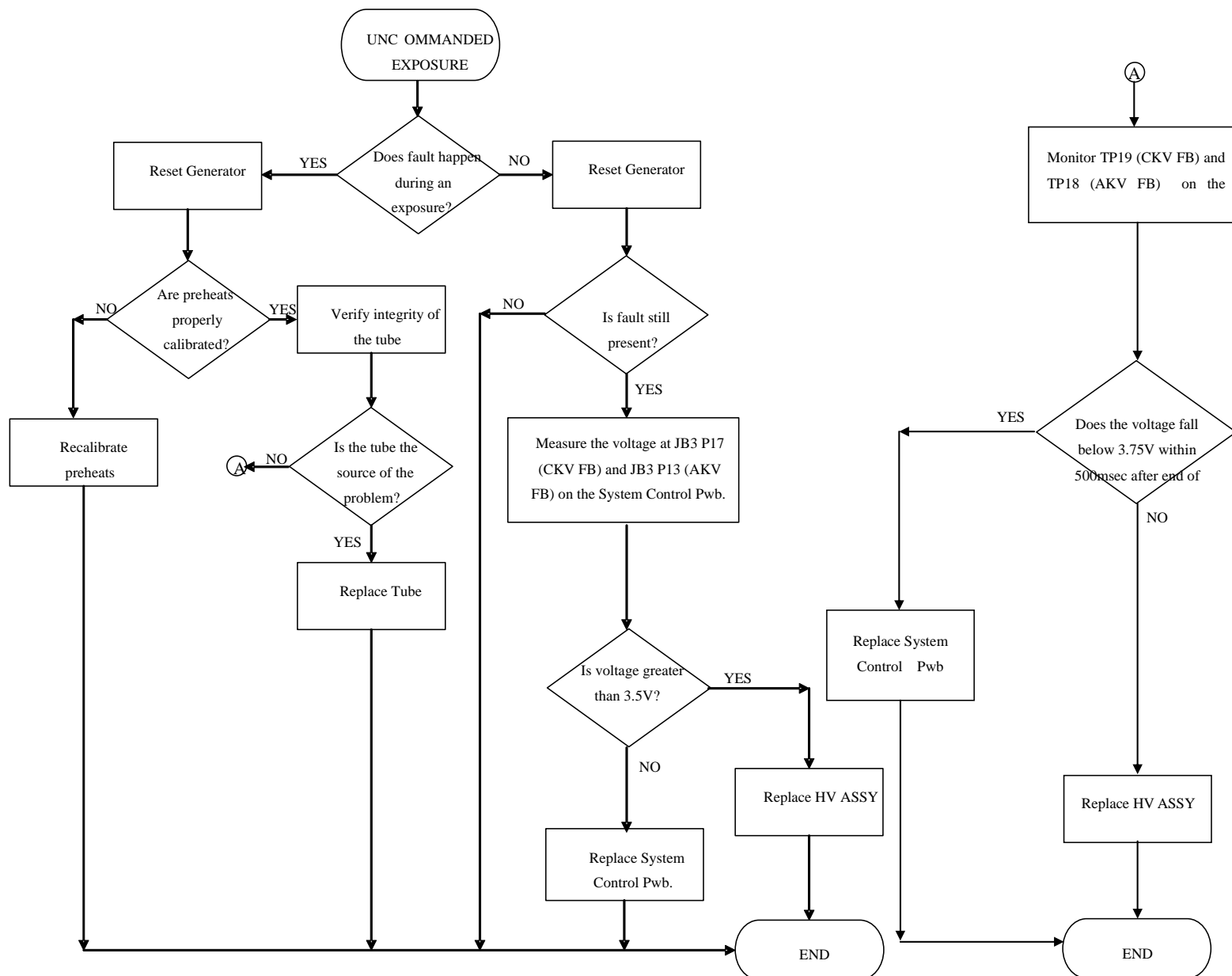
# Cathode Overcurrent (For CHASSIS X3815)



## Starter Error (For CHASSIS X3815)



# Uncommanded Exposure (For CHASSIS X3815)



## Anode Arc Fault (For Fironia-50)

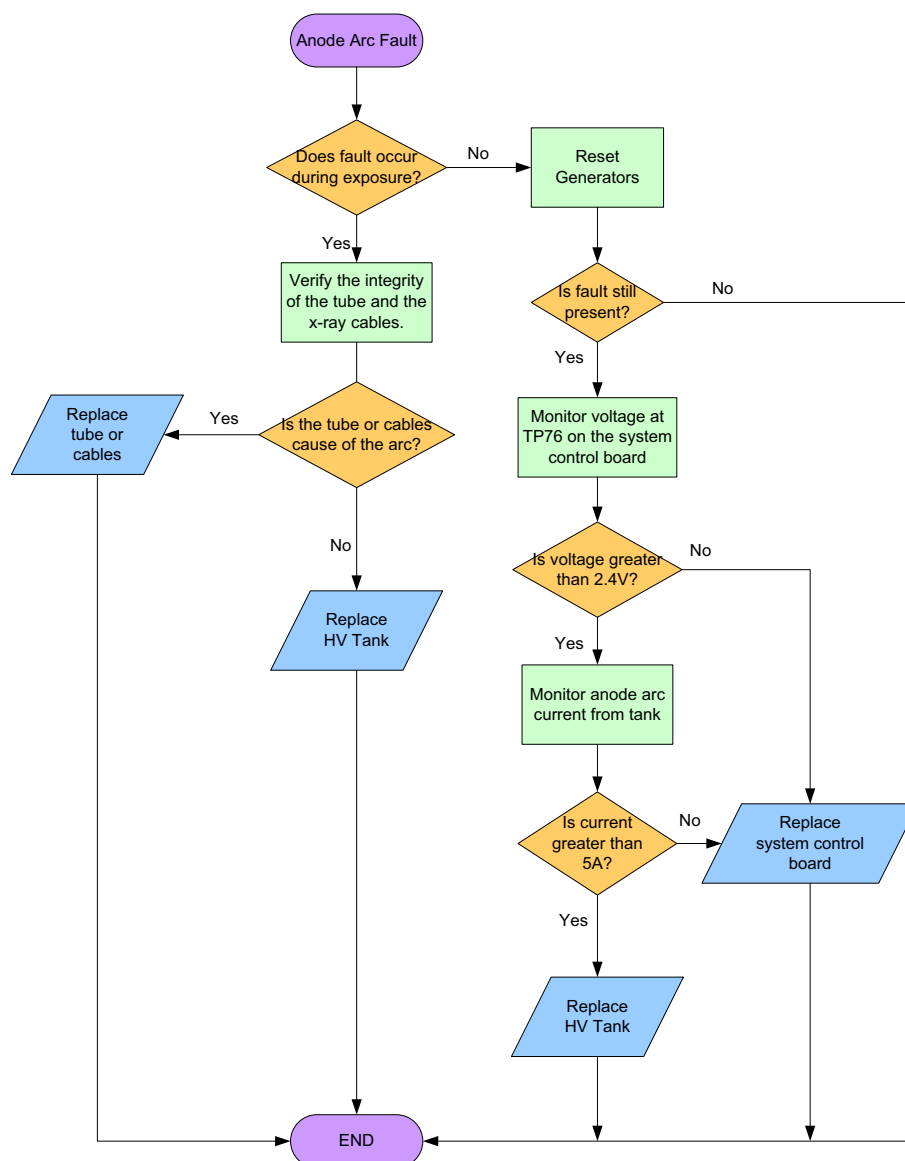


Figure 17: Anode Arc Fault

## Cathode Arc Fault (For Fironia-50)

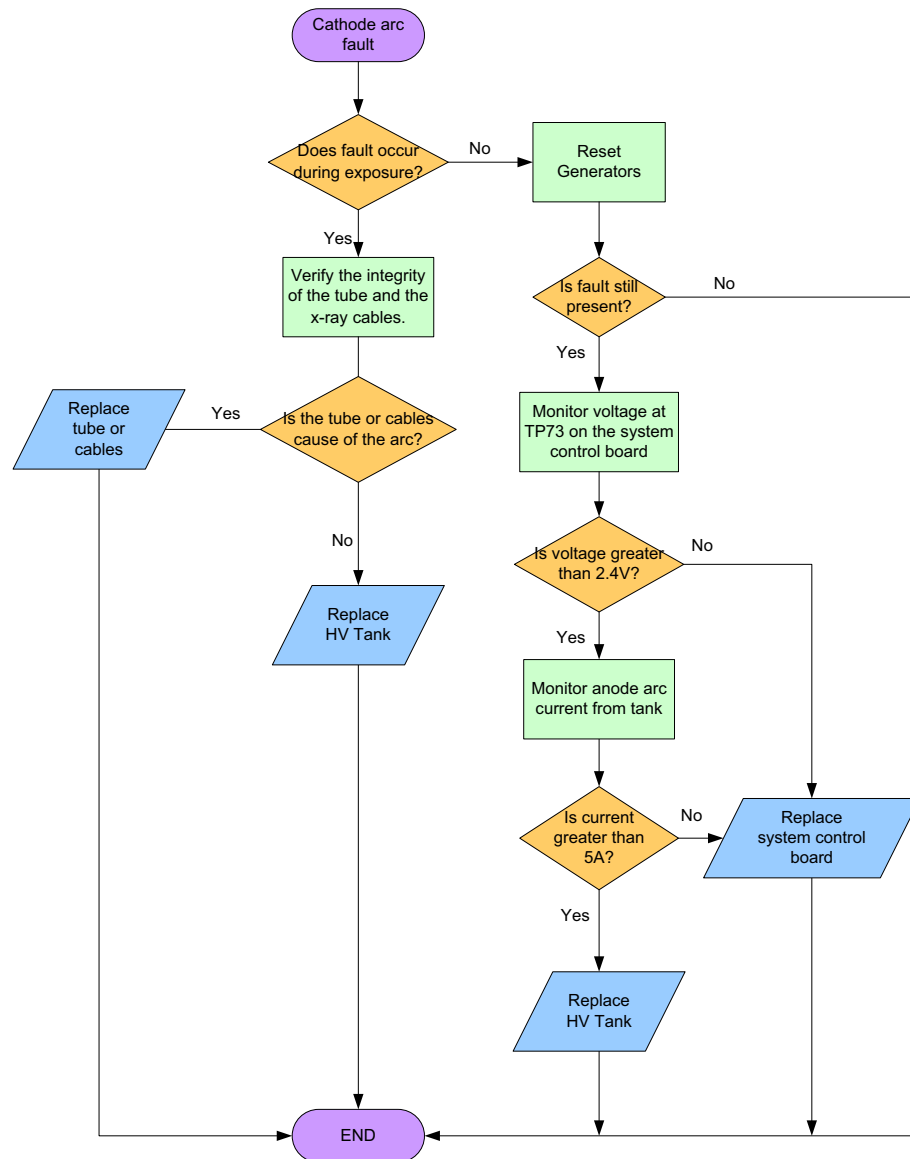


Figure 18: Cathode Arc Fault

## Arc (For Fironia-50)

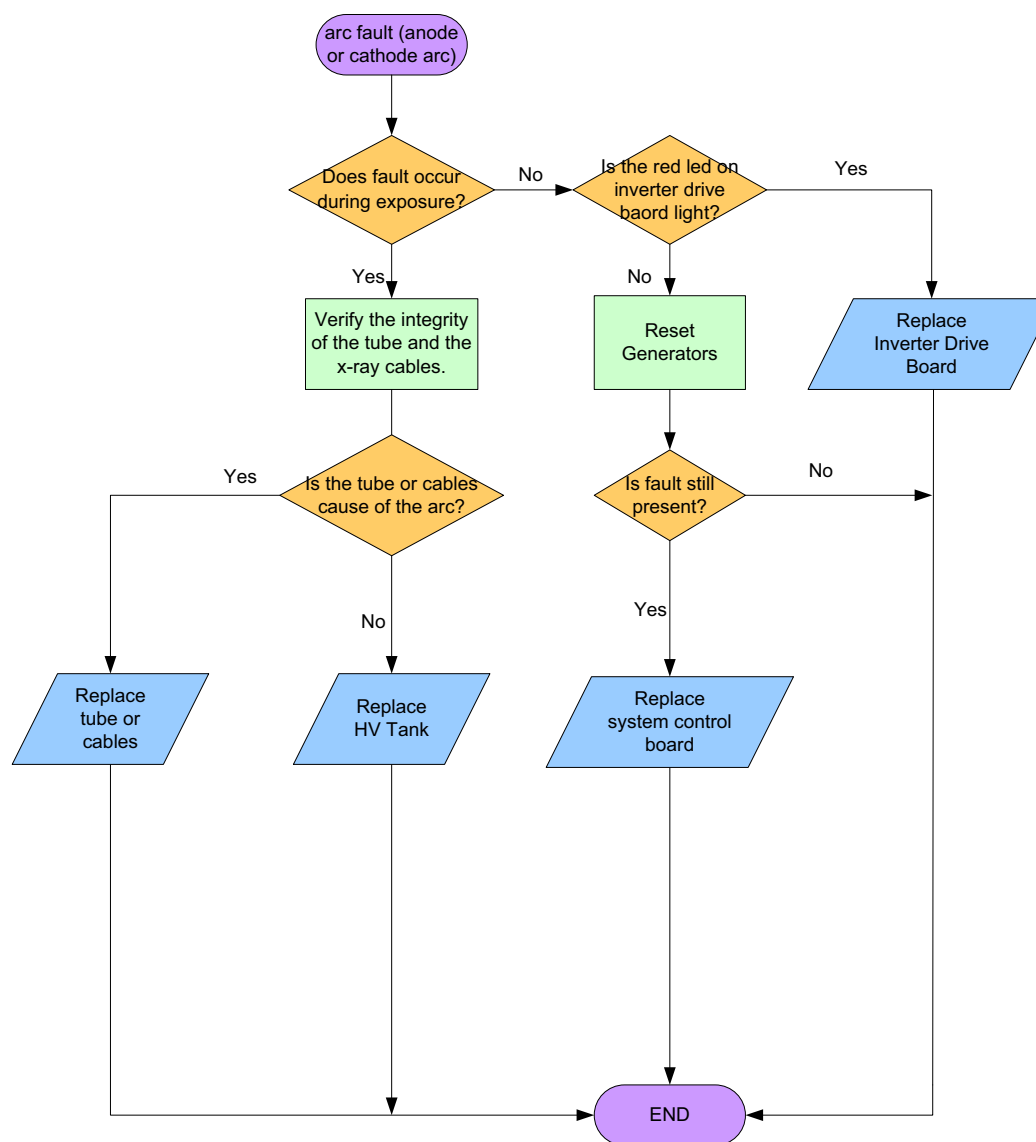


Figure 19: Arc

## Anode Overvoltage (For Fironia-50)

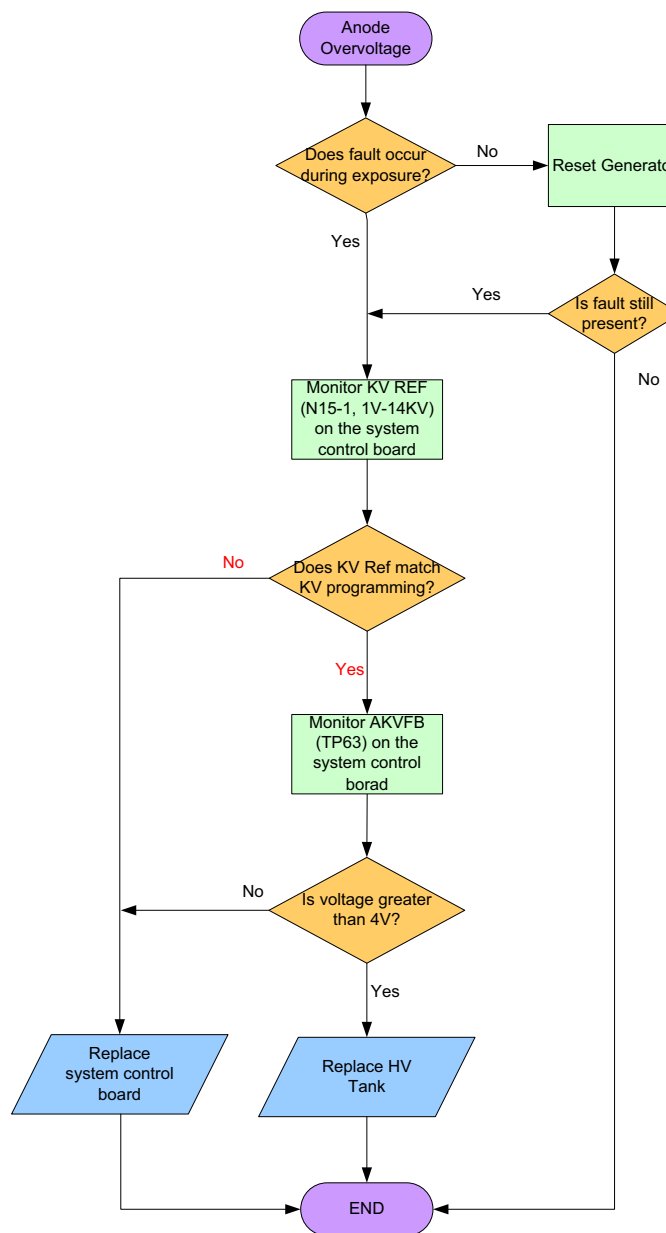


Figure 20: Anode Overvoltage



## Cathode Overvoltage (For Fironia-50)

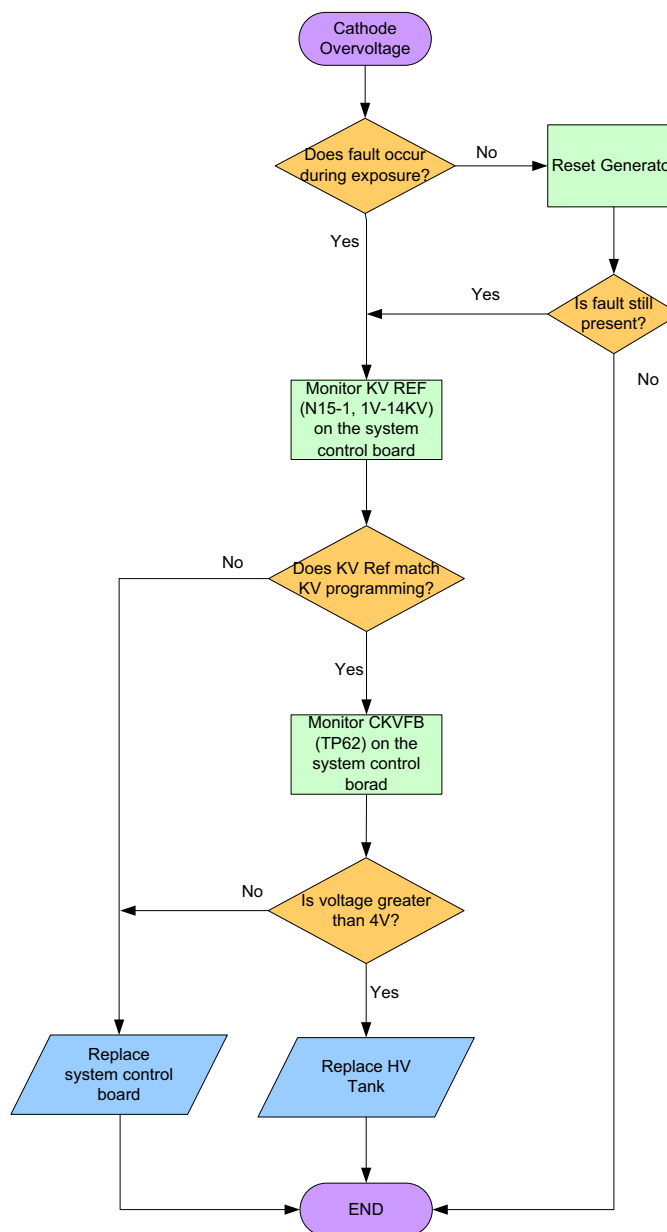


Figure 21: Cathode Overvoltage

## Filament fault (For Fironia-50)

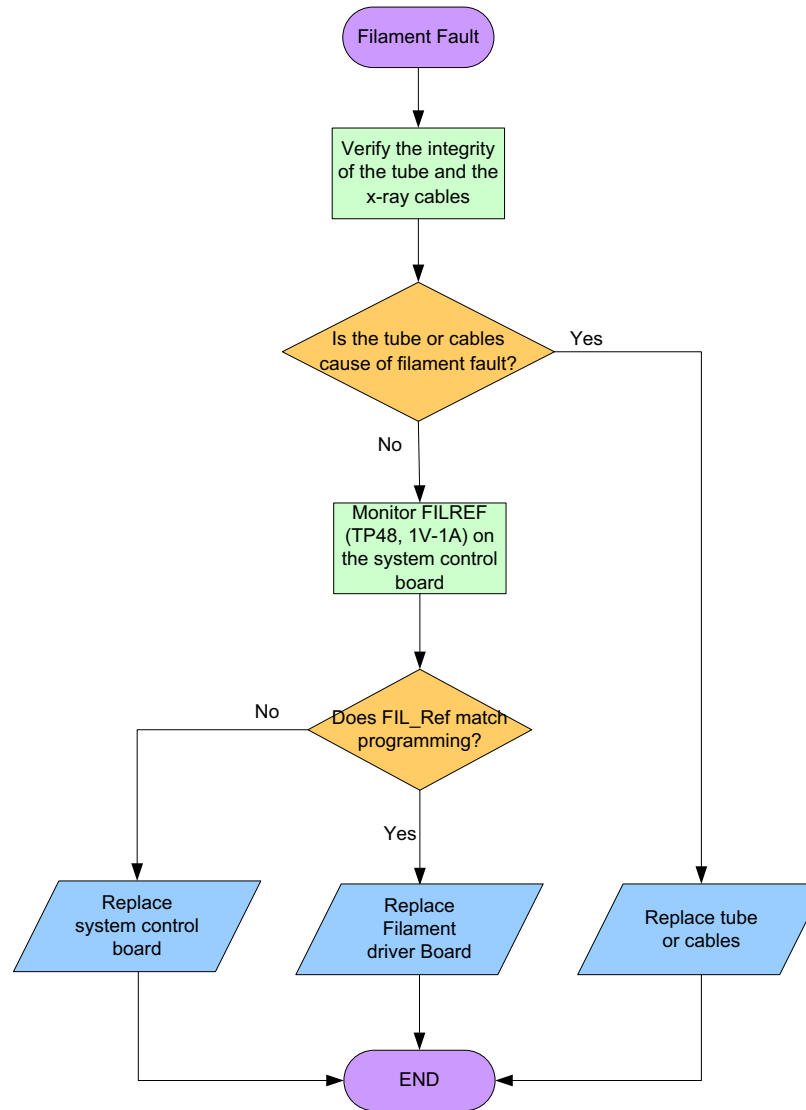


Figure 22: Filament Fault

## Inv\_tmp Fault (For Fironia-50)

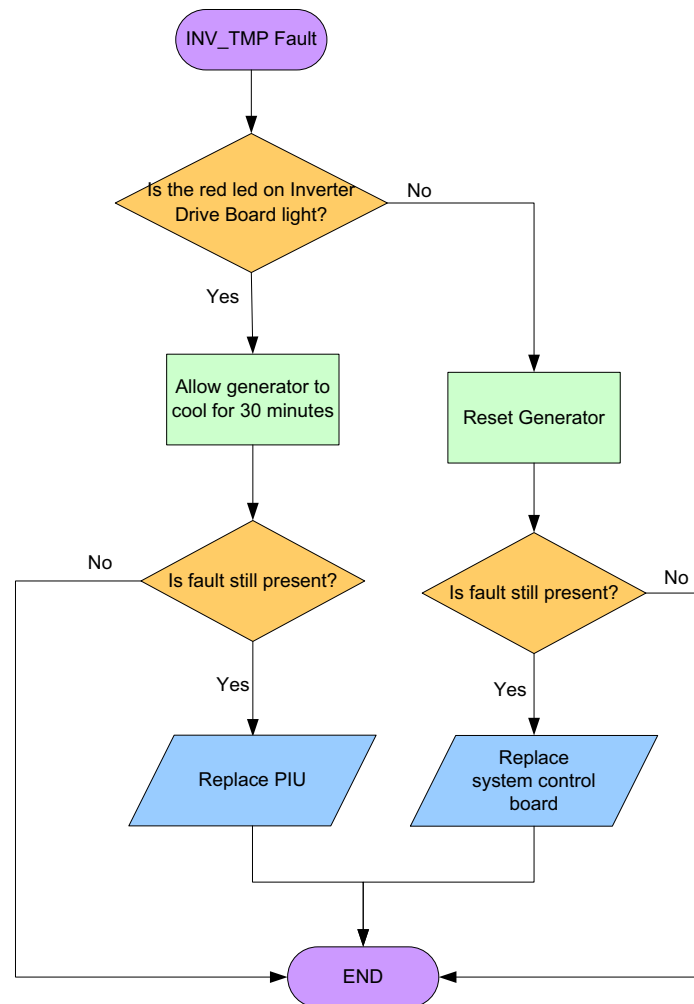


Figure 23: Inv\_tmp Fault

## KV Reg Error (For Fironia-50)

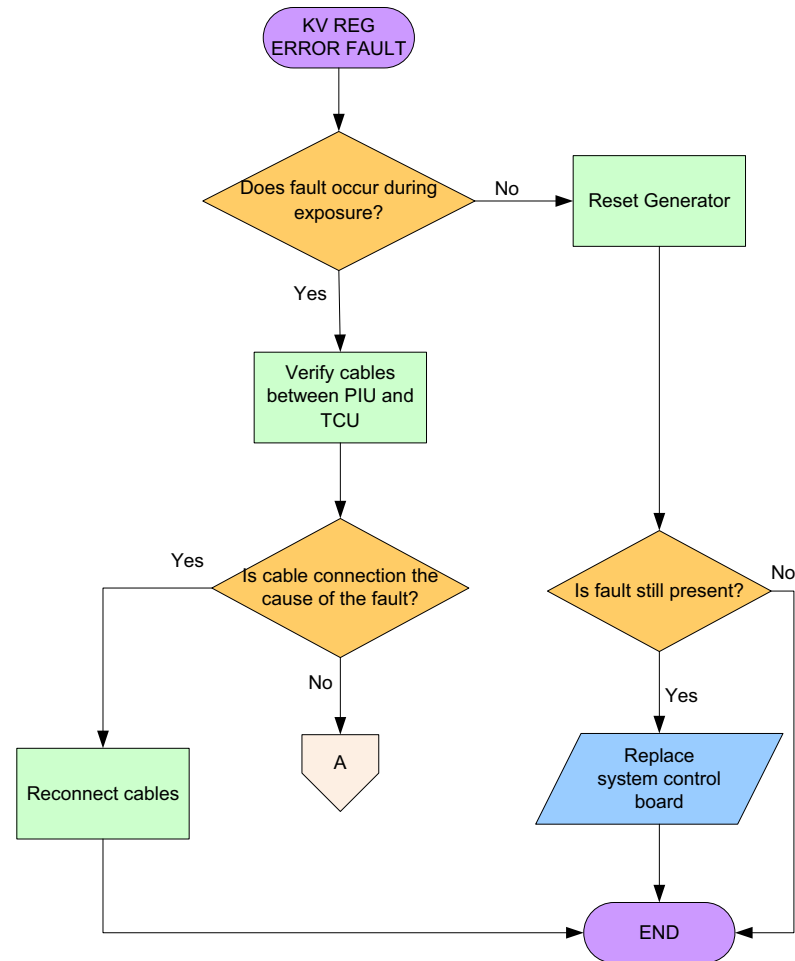
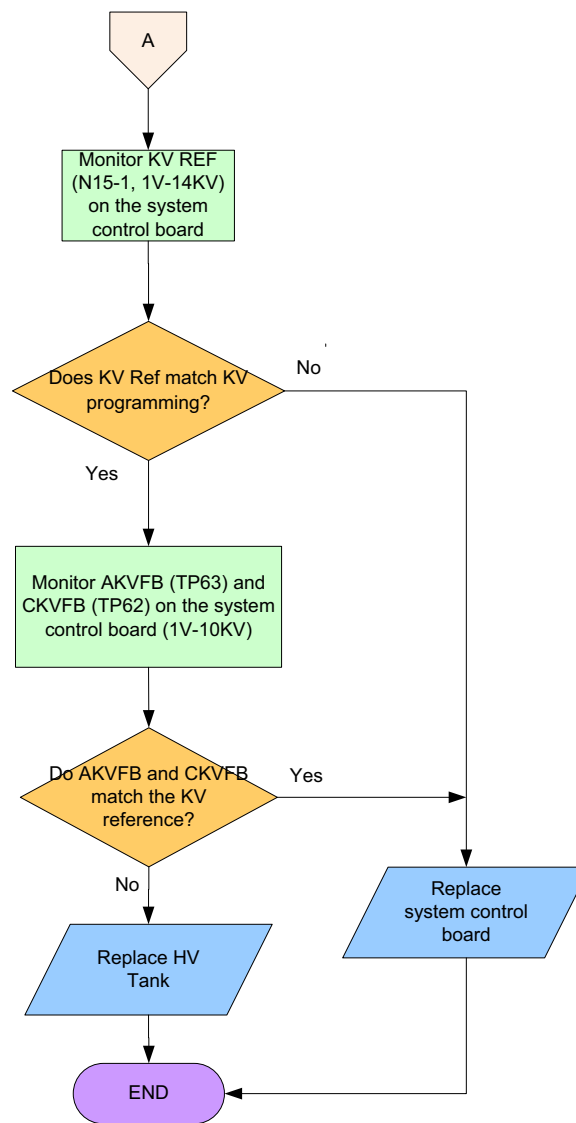


Figure 24: KV Reg Error

**Figure 25: KV Reg Error\_A**

## mA Reg Error (For Fironia-50)

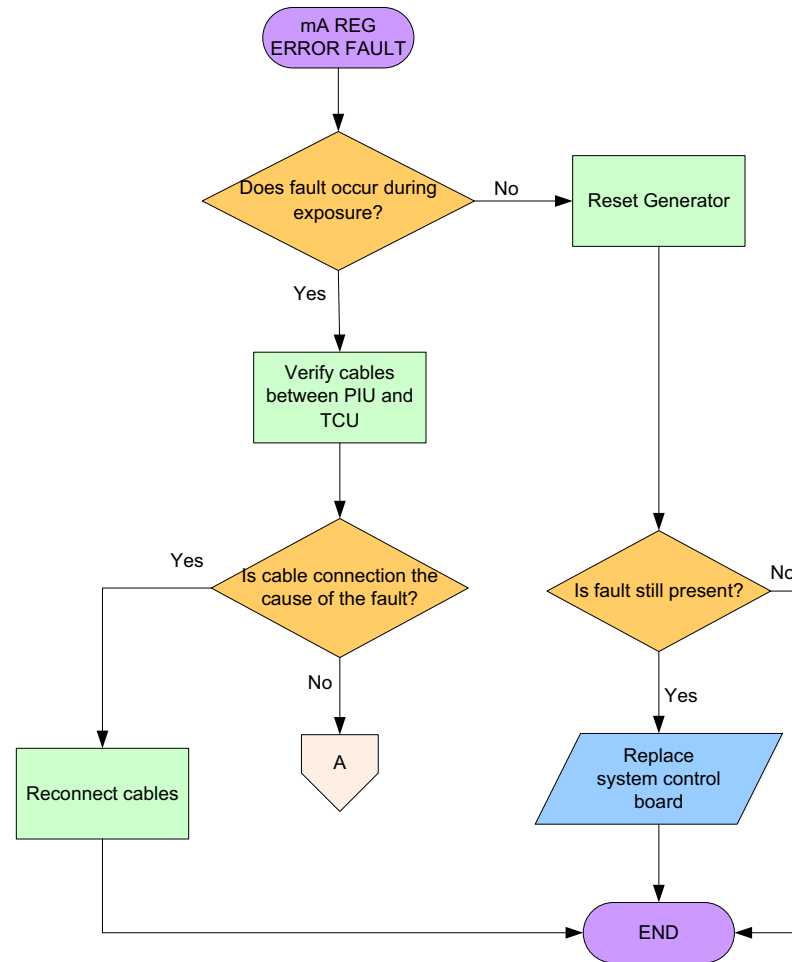


Figure 26: mA Reg Error

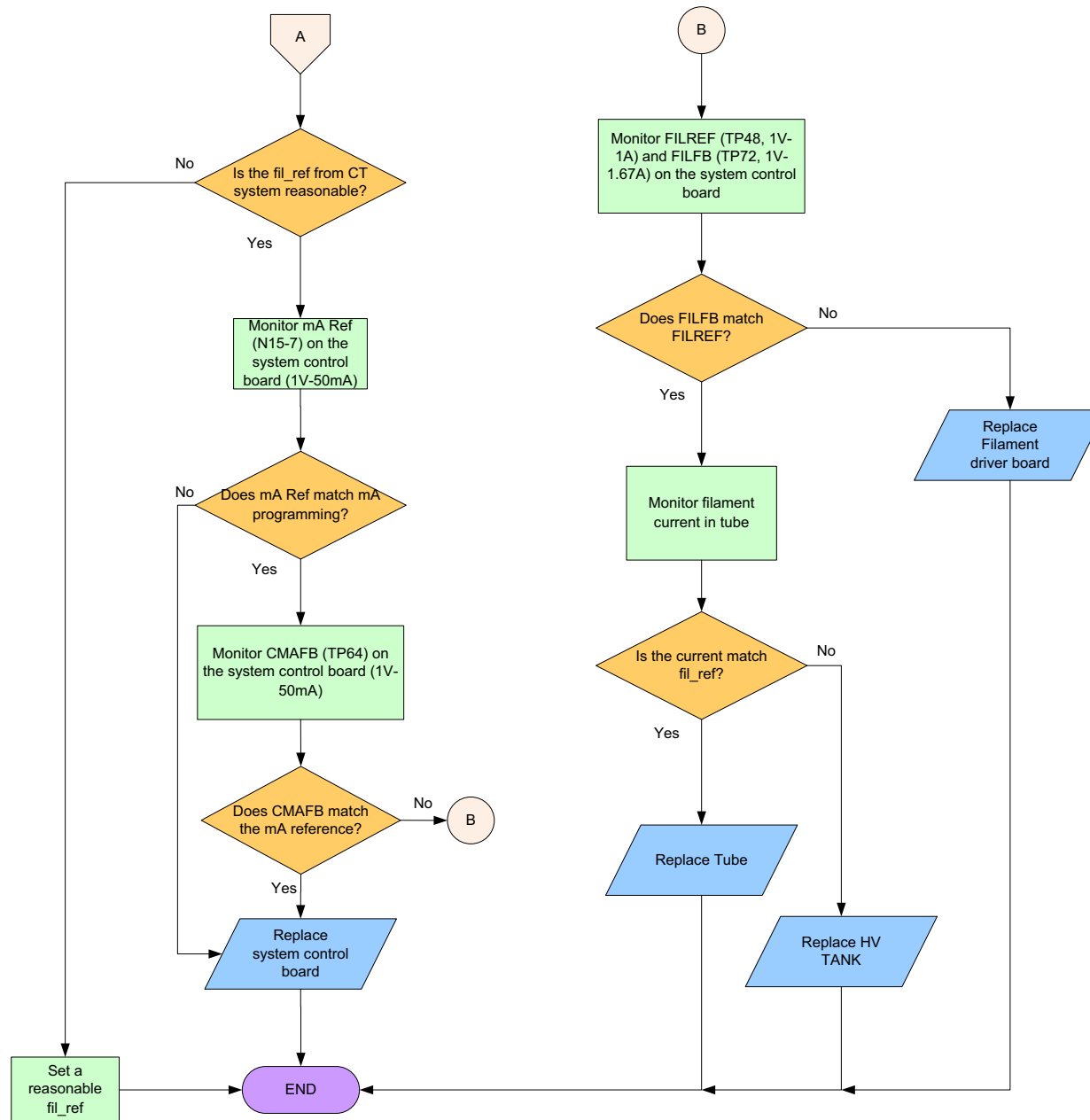


Figure 27: mA Reg Error

## Cathode Overcurrent (For Fironia-50)

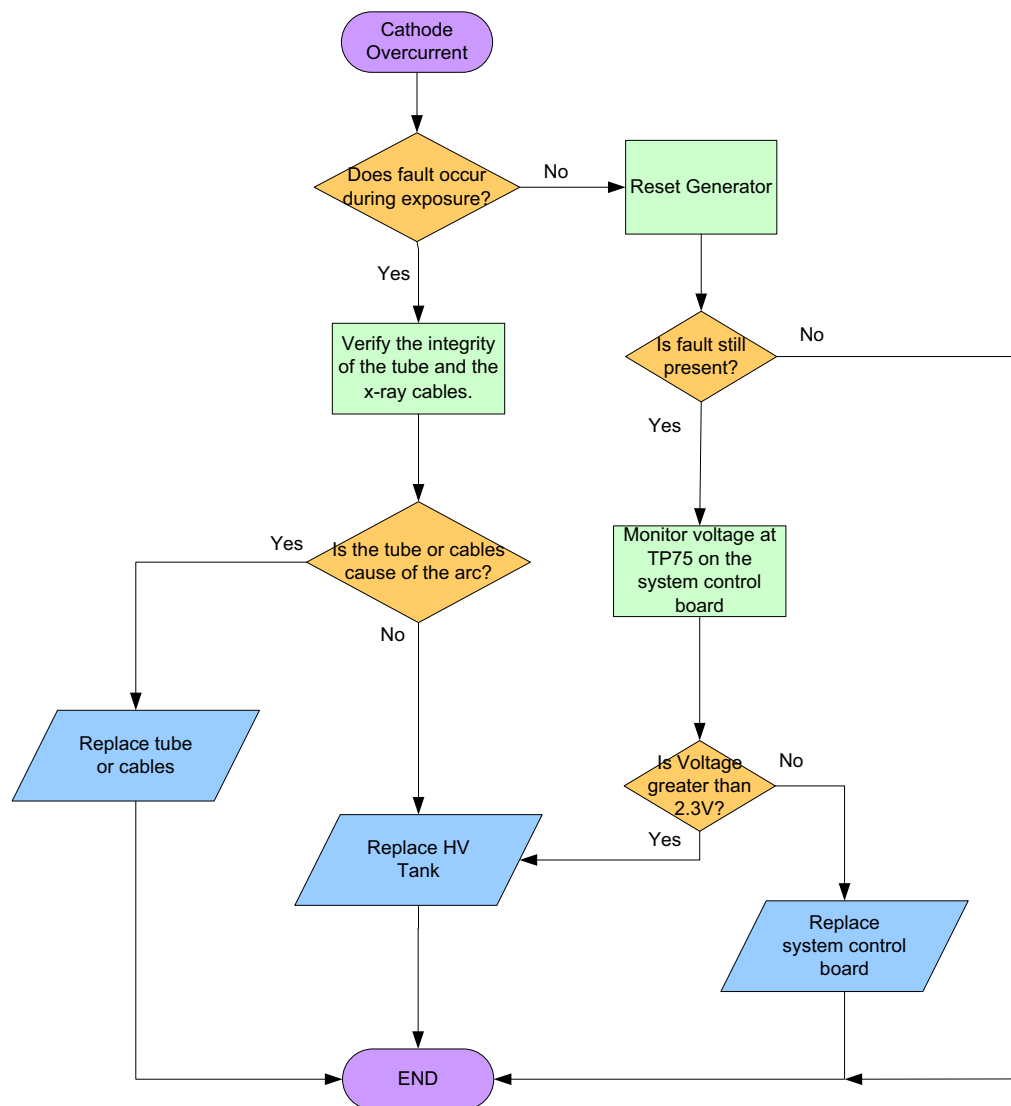


Figure 28: Cathode Overcurrent



## Starter Error (For Fironia-50)

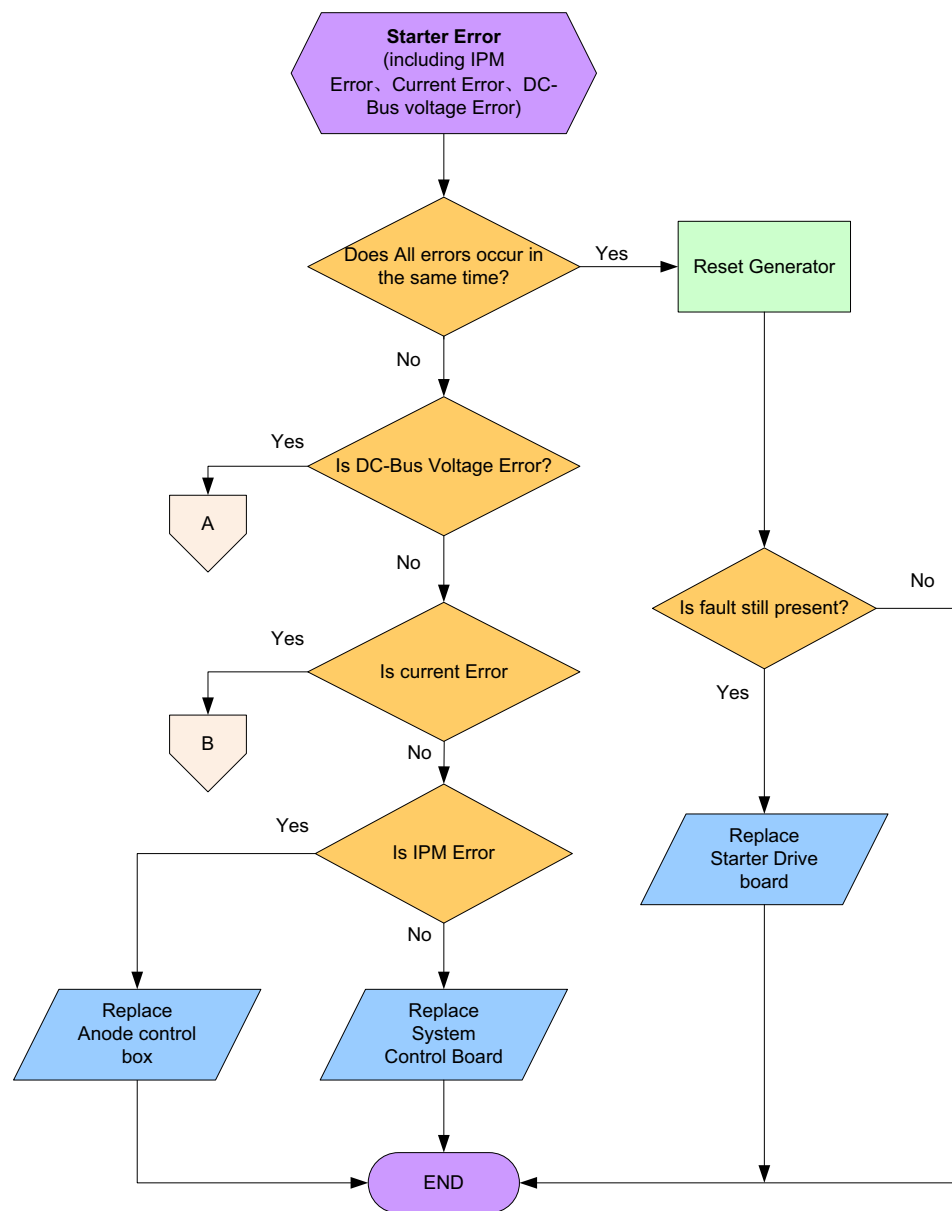
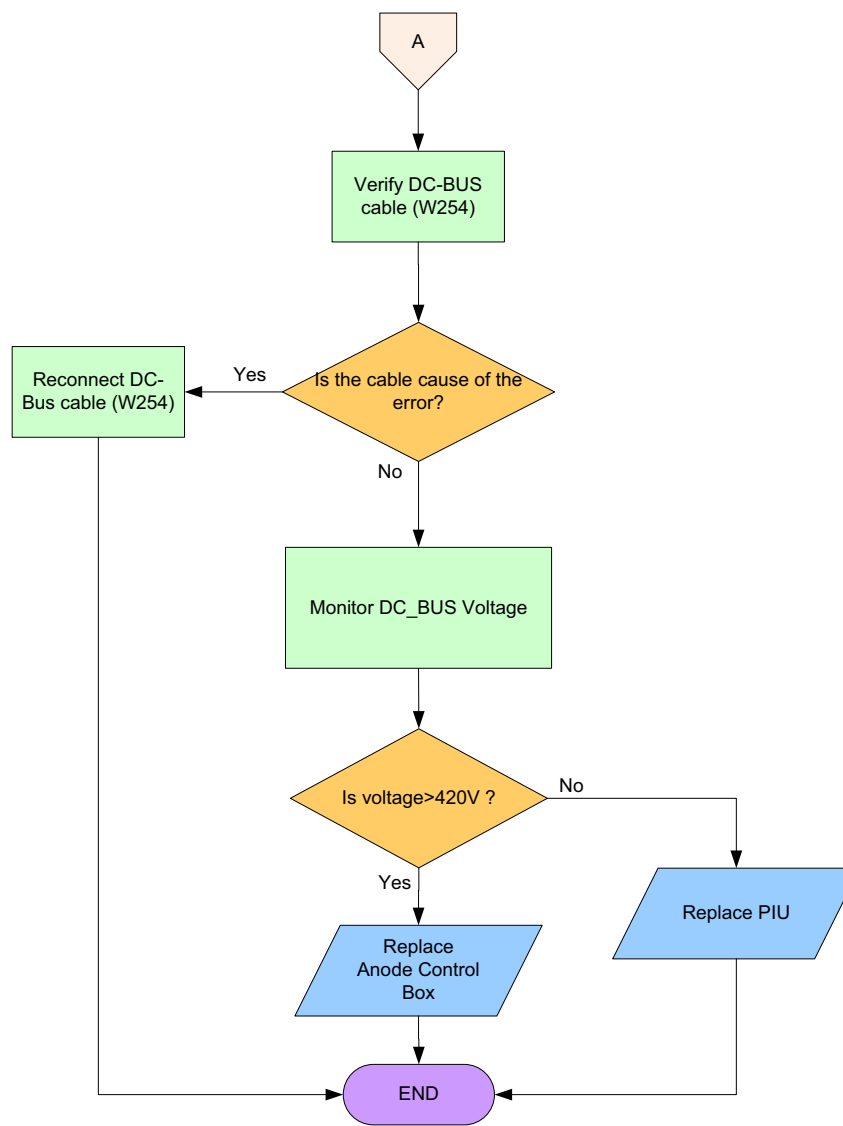
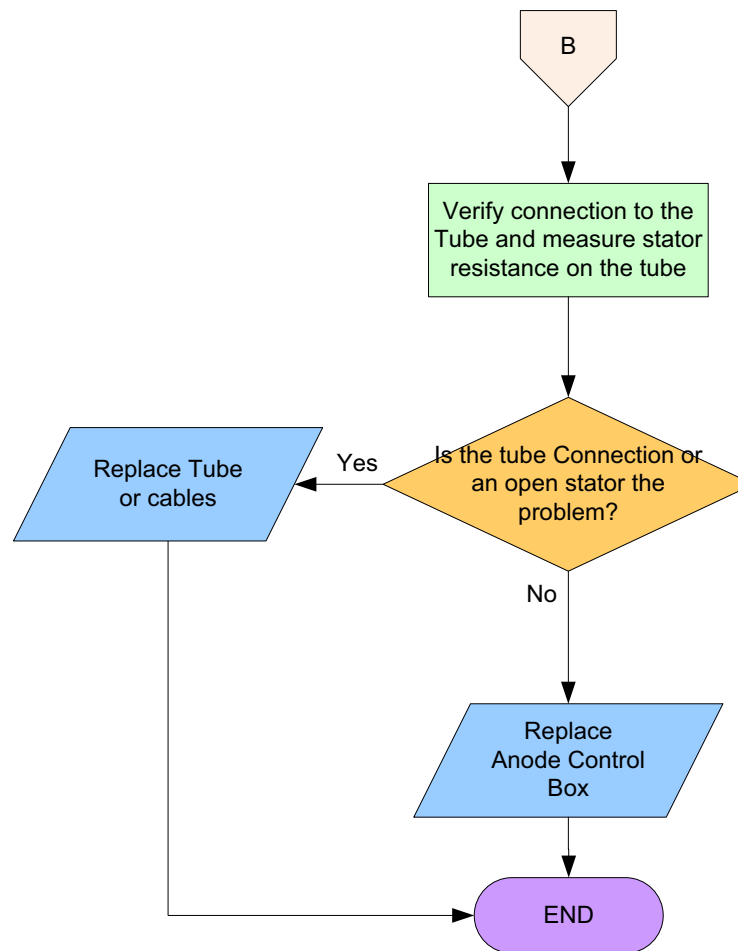


Figure 29: Starter Error

**Figure 30: Starter Error\_A**

**Figure 31: Starter Error\_B**

# Data Path

The purpose of this document is to guide the service engineer during Data Path Troubleshooting.

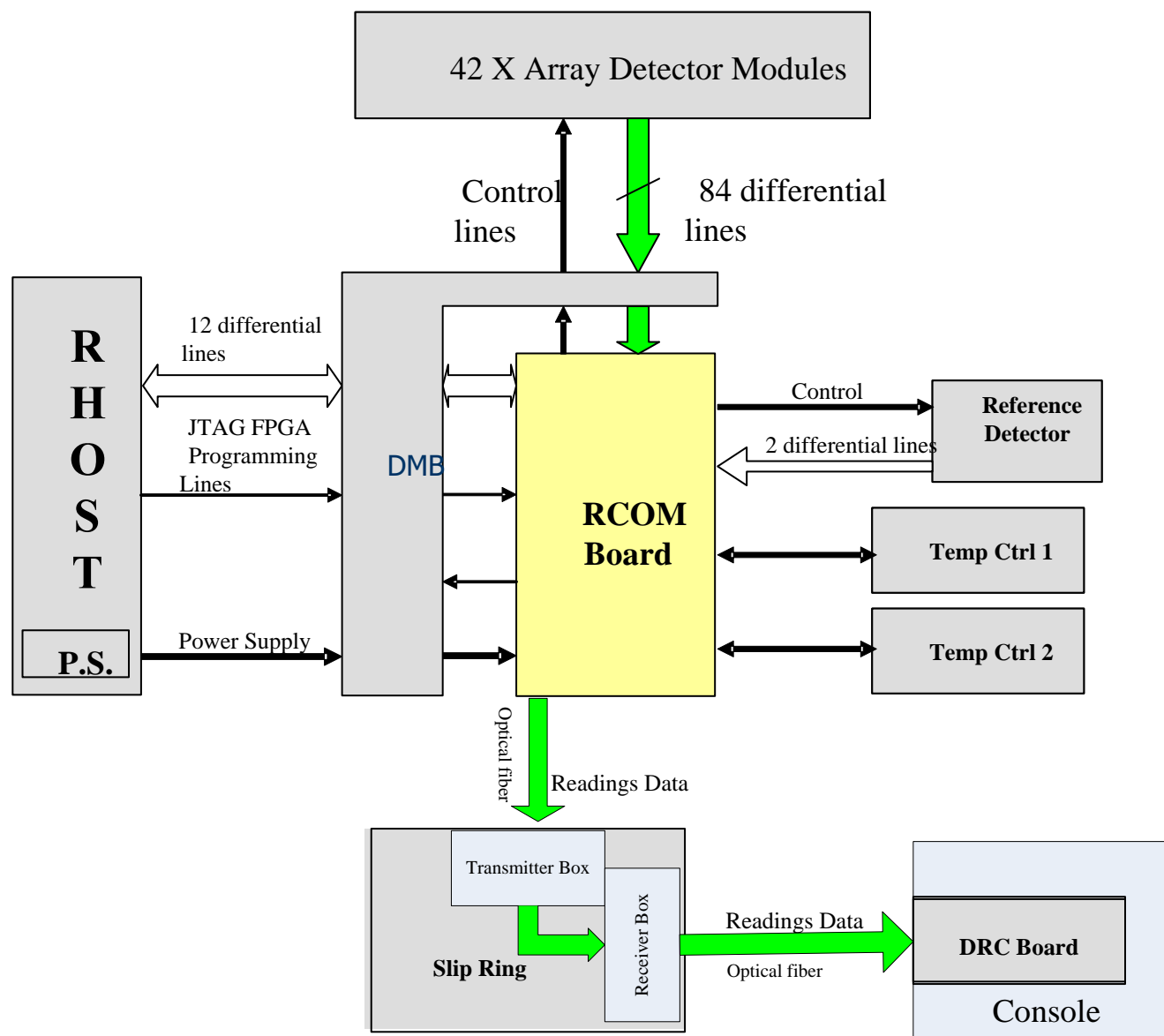
The Data Path test is a Physical / Low-level test, checks the hardware part of the data link. It checks data sent by the RCOM to the Host Computer for transmission errors at the physical link level.

The Data Path Troubleshooting does not cover the Initialization and X-Ray ON process. Other troubleshooting will cover this process.

This section contains the following:

- [Data Path Overview Block Diagram](#) on page 86
- [Data Path Troubleshooting Flowchart](#) on page 88

## Data Path Overview Block Diagram



## Data Path Overview Block Diagram Description

The steps on the Data Path flow (between the RCOM and DRC Board) are:

1. Transmit data from the RCOM to the Transmitter Box (Slip Ring) on the Rotor Gantry.
2. Transmit data from the Transmitter Box (Slip Ring) to the Receive Box on the Stator Gantry via Radio Frequency.
3. Transmit data from the Receive Box on the Stator Gantry to the DRC board on the Host Computer, via optical fiber.

## Description of the Resend Mechanism

1. RCOM is the transmitter; DRC is the receiver.
2. The Readings are transmitted on the serial line at all times, without intermission. Only complete Readings are sent.
3. The Comm\_Ok signal is sent by the DRC board to inform the transmitter circuit (on the RCOM board) of good reception of the last transmitted Reading.
4. The acknowledgement is done by the transition of the Comm\_Ok signal levels, high to low transition or low to high transition.

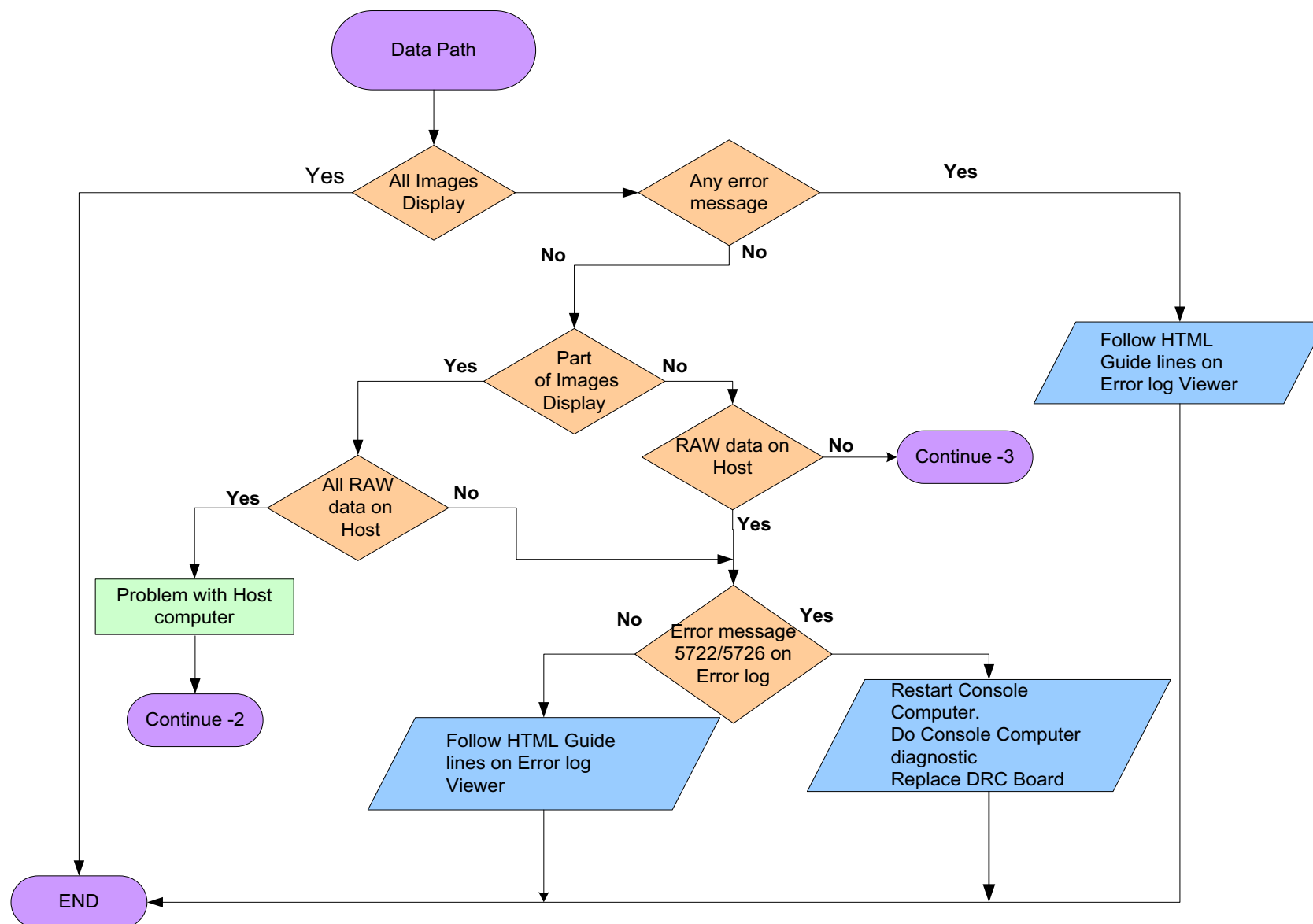
## Tools for Troubleshooting Problems

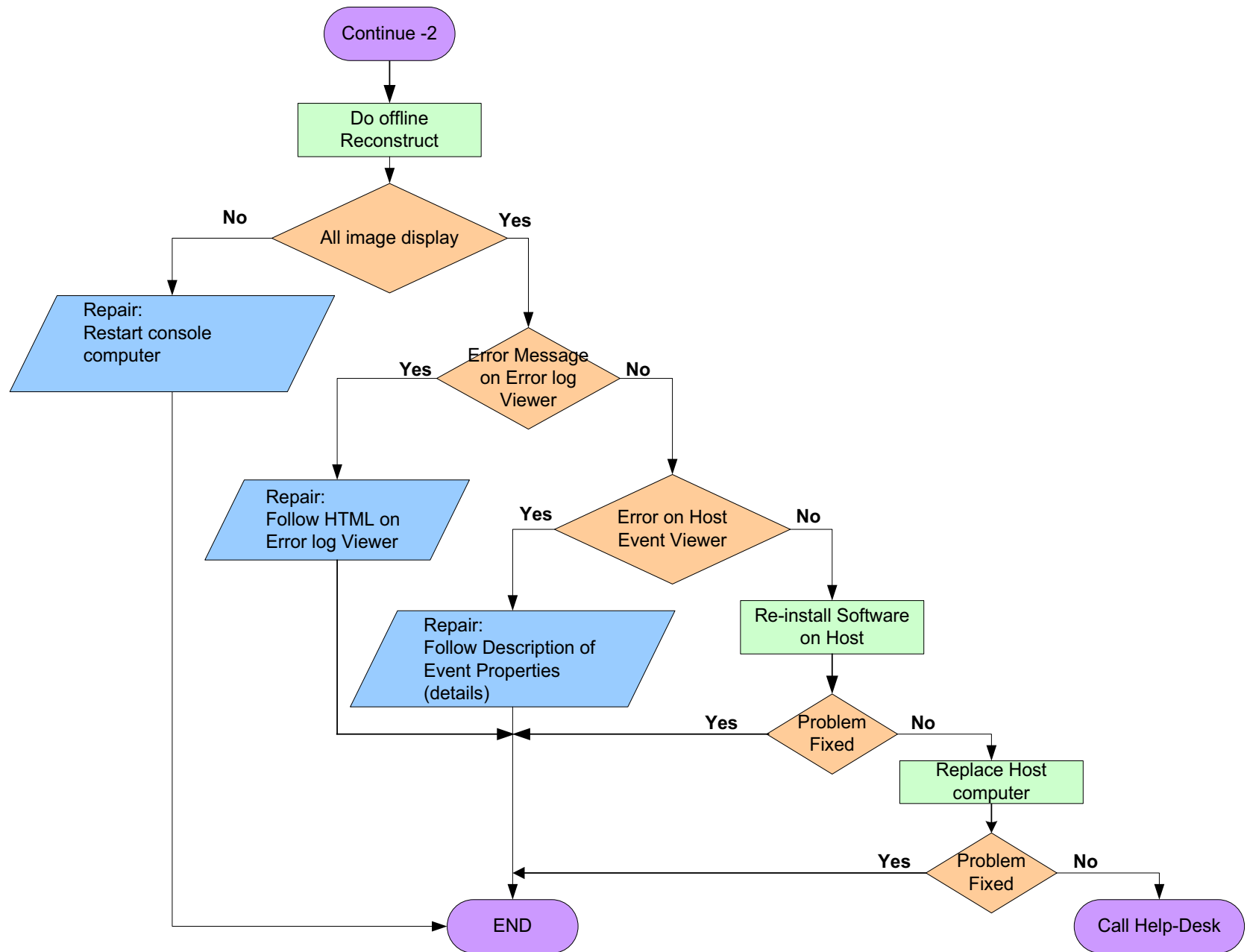
The tools for troubleshooting problems are:

1. Error Log Viewer (Application on system)®D includes Error codes/ messages, error description and guidance for solving problems.
2. Scan Analysis (ctimgtool.exe)\_ troubleshoot View (data) Header.
3. Transmit line bypass test (bypass slip ring system)\_ Directly connect optical fiber from RCOM to DRC Board.
4. Hardware troubleshooting-- LEDs, test points.

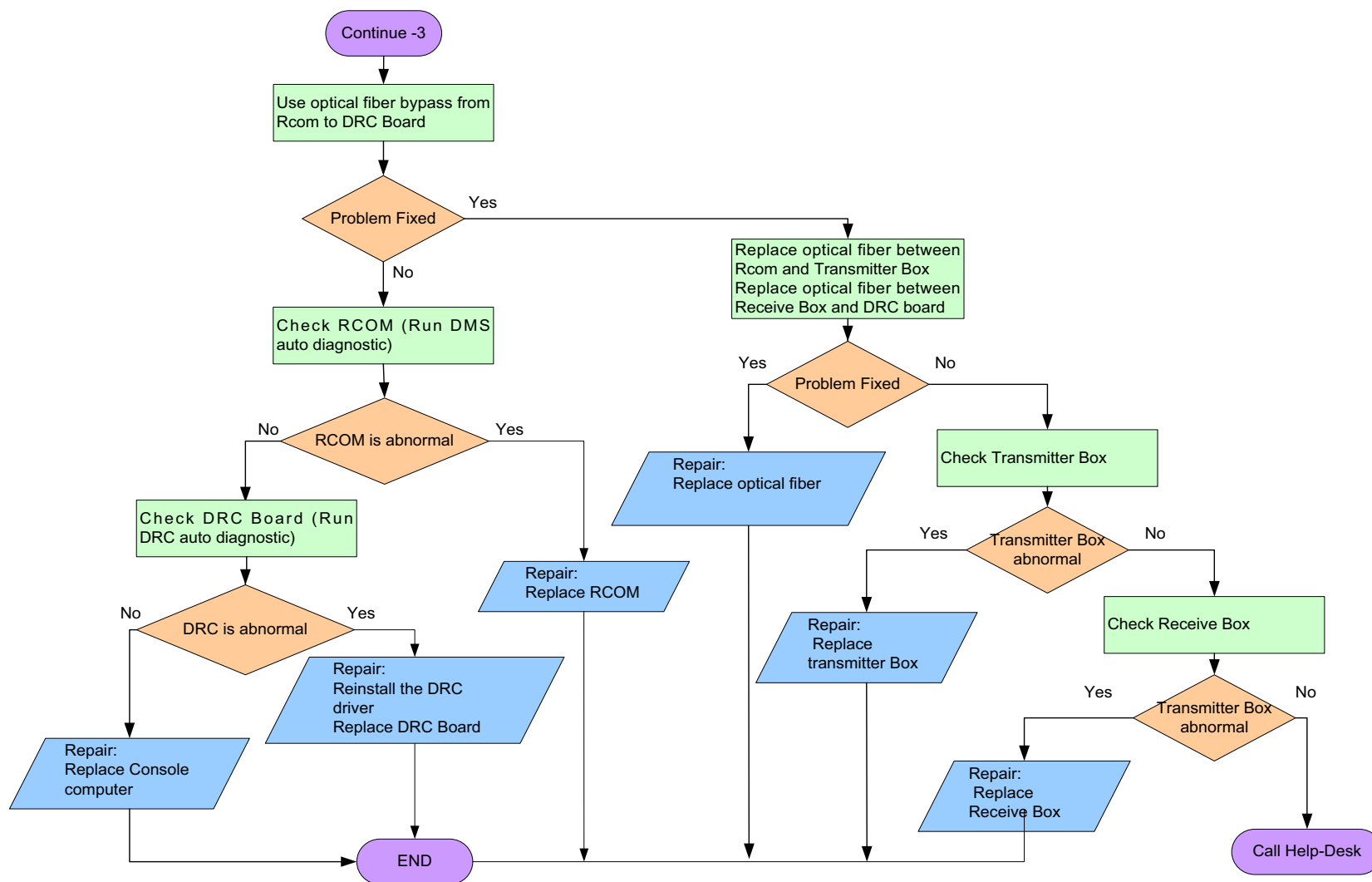
**NOTE**            **It is recommended to start troubleshooting via the Error log codes/ messages that system generate during operation and analysis tool, and only after trying those options, move to Hardware.**

# Data Path Troubleshooting Flowchart

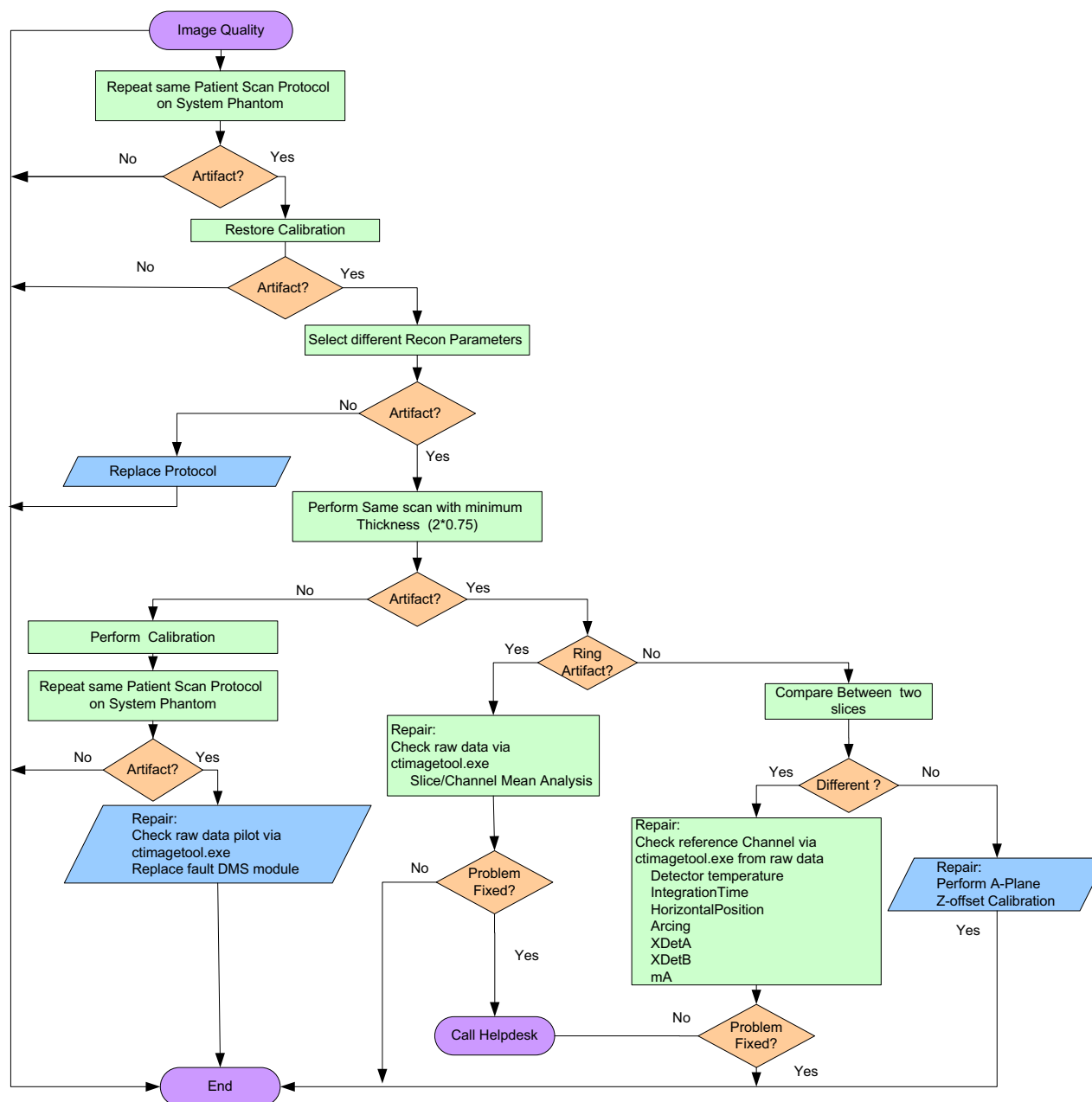


**Figure 32: Data Path Troubleshooting Flowchart continued**

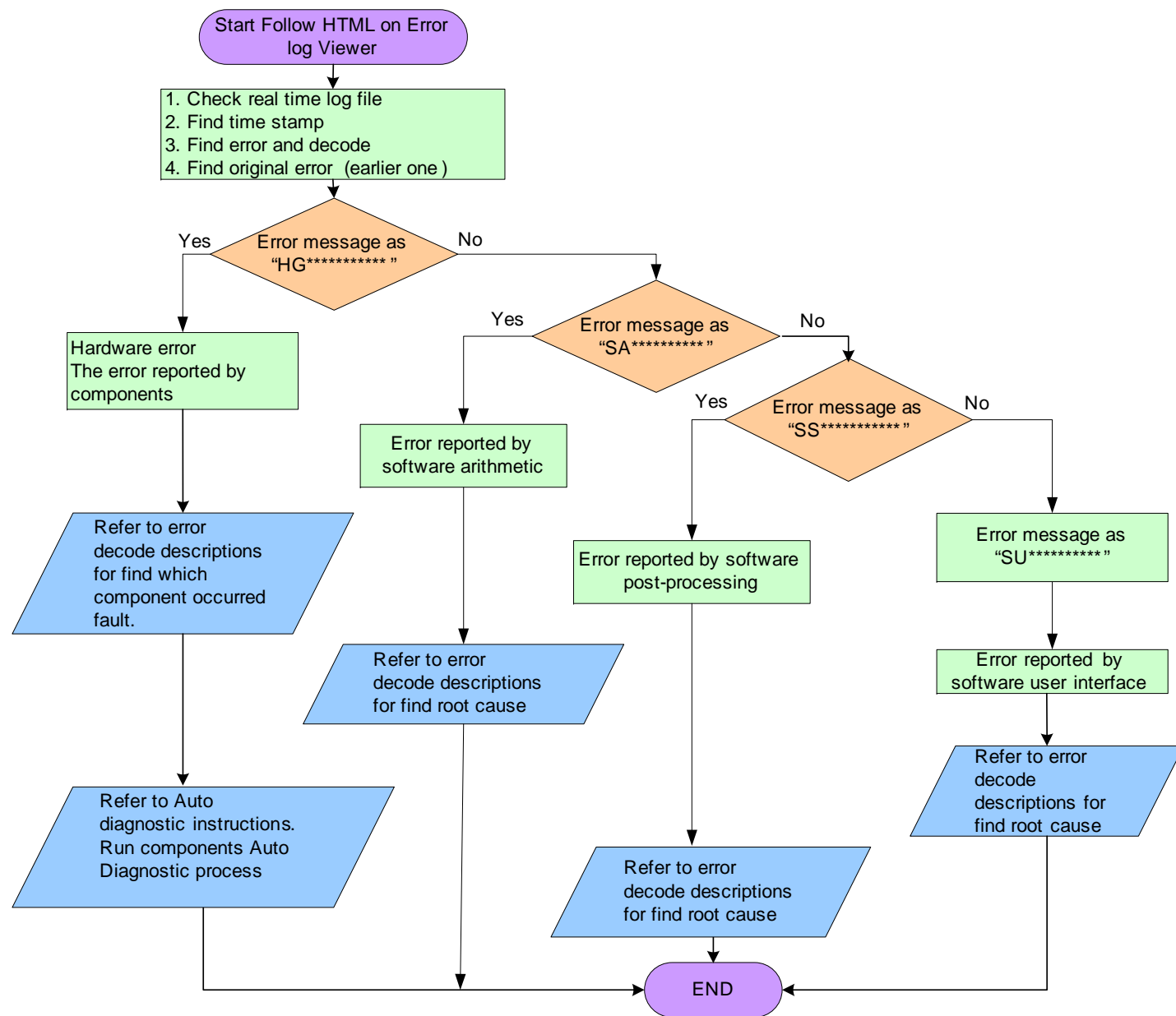




# Image Quality Troubleshooting



# Follow HTML on Error log Viewer



# Error Code Description in System Log

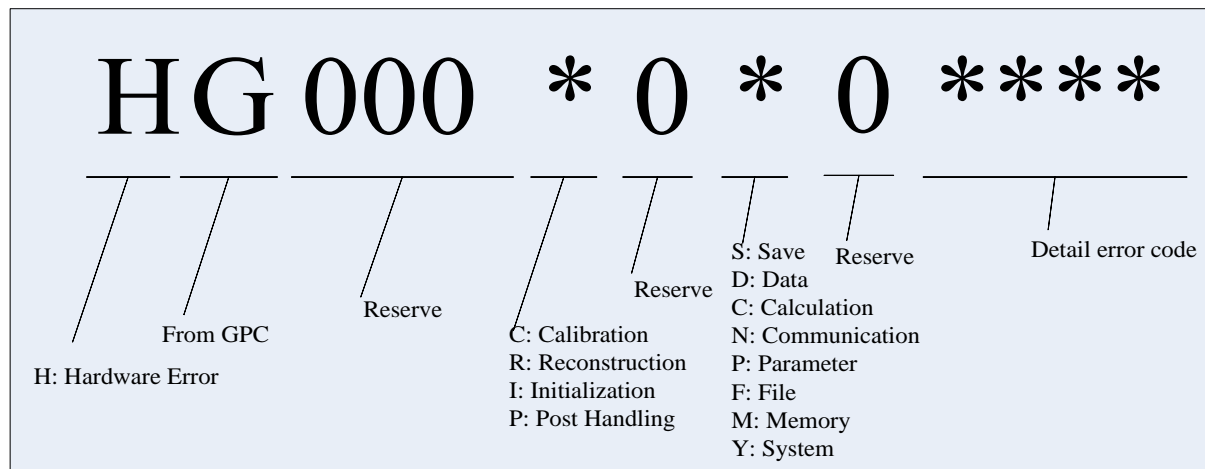
## Error Level Description

Table 23:

Level	Description	Action on the Application Software
Fatal	System is down. System Restart fails due to system malfunction.	Error message box appears to user and alert is generated in Remote service.
Error	Major system parameter out of scanner functional specification. The system can continue with this error. For example some large arcs.	For most cases the warning message will Not show in the Message Box. But in some cases, such as a large Arc, the warning message will be shown on the Message Box.
Warning	Minor error generated by the system, that does not stop system operation. For example some small arcs.	The error message will Not show in the Message Box.
Information	System response other than Fatal, Error, or Warning	In some cases the associated message is displayed on the monitor.

## Error Code Defination

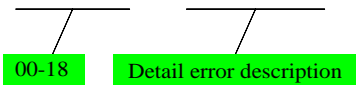
### Hardware Error Code: HG000\*0\*0\*\*\*\*



Detail Coding Description

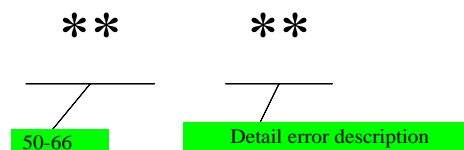
The following table describes the error generated during the running of a process:

\*\*\* \*\*



Code	Reported By	Code	Reported By
00	DRC	10	A-Plane
01	GPC	11	HV
02	GPC service mode	12	DMS
03	GPC Pre-Scan	13	R-Host
04	GPC Scan	14	UCOM
05	Couch	15	Public Function
06	Gantry	16	Task Abort
07	G-Host	17	Net Connecting
08	Panel	18	Task Monitor
09	CT-Box		

## Errors Generated by Components



Code	Reported By	Code	Reported By
50	Couch	59	DMS
51	Left Panel	60	Aplan
52	Right Panel	61	HV
53	CT-Box	62	UCOM(G-Host)
54	Tilt	63	UCOM(Couch)
55	Rotor	64	UCOM(Left Panel)
56	G-Host I/O	65	UCOM(Right Panel)
57	G-Host	66	UCOM(R-Host)
58	R-Host		

## Software Arithmetic Error Code: SA00000\*\*\*\*\*

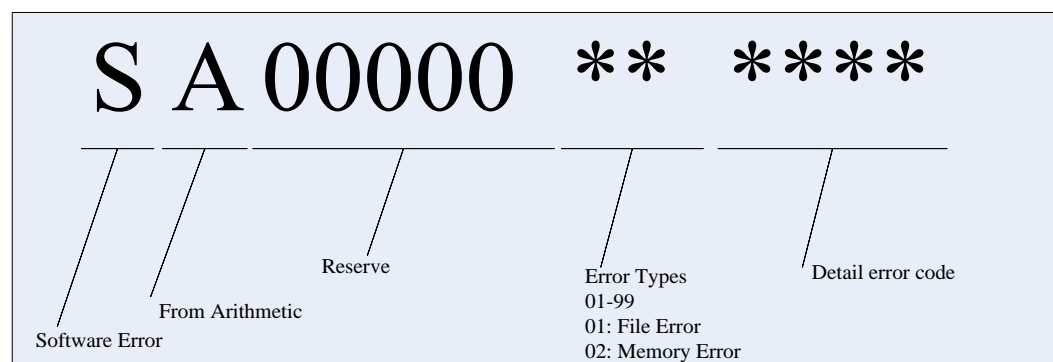


Table 24:

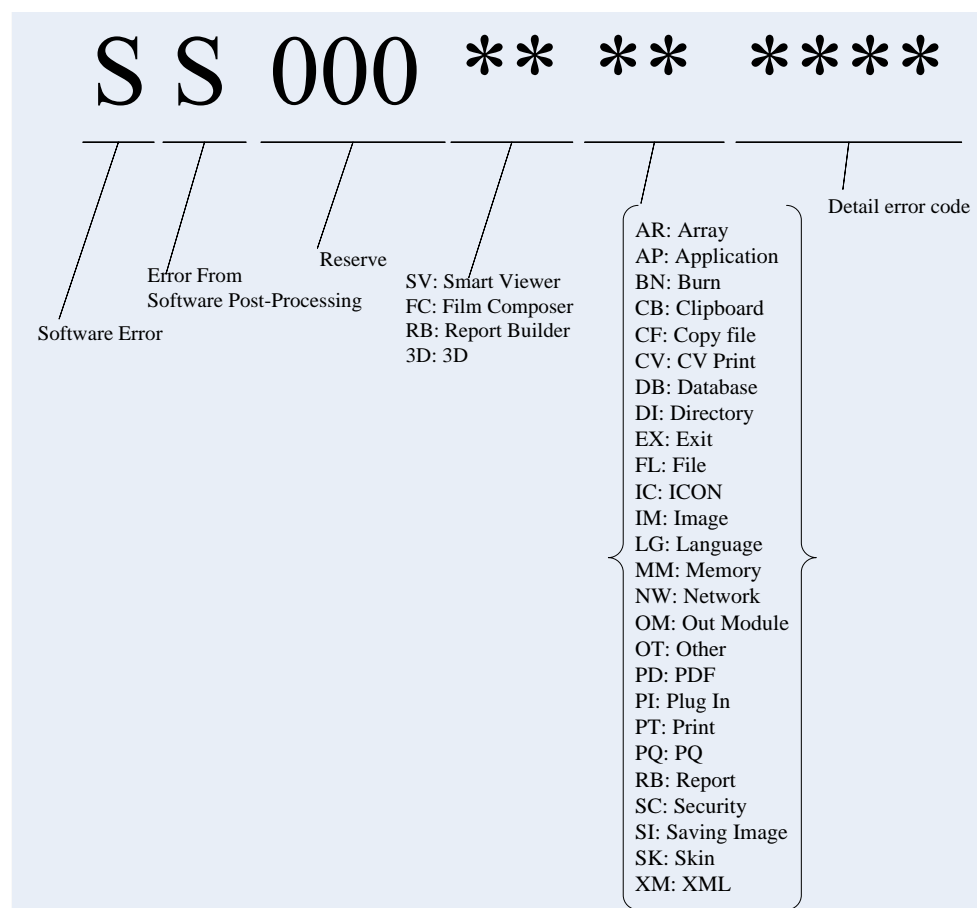
Error Type	Description	Suggestion
01	File error: Creating, reading, opening, writing, saving or deleting file error (Raw data file, Calibration file, Configuration file, convolution kernel file)	Restart console, reinstall software, Bug report for software bug
02	Allocating Memory error	Restart console, reinstall software,
03	Communication error between Recon and Host	Restart console, reinstall software, replace computer
04	Saving error; too many image files in memory that need to be sent to Host	Change the scan or reconstruct protocol, software bug for software bug
05	Data Error Raw data error, the value is too high or too low, or focus value is faulty.	Check raw data via ctimagetool.exe
06	Calculation Error	Bug report for software bug
07	Parameter Error	Bug report for software bug
08	System Error	Restart console
09	Loading Dynamic Library Error	Reinstall software
10	Excel Library process Error	Software bug
11	FP Library process Error	Software bug
12	DRC Board fault	Run DRC Board diagnostic
13	Configure Error	Restart software, reinstall software
14	Raw data library Error Process or scan task fault	Restart software, reinstall software
16	VersionInfoErr Library file, configuration file, convolution kernel file and calibration file do not match.	Reinstall software
31	XCrosstalk_Err Crosstalk calibration process error	Check the phantom position and calibration process, Restart software, reinstall software



Table 24:

Error Type	Description	Suggestion
35	CorTbl Error The Calibration table file is missing	Restore calibration file, reinstall software
37	PerformanceDLL_Err	Reinstall software
99	Unknown type Error	

### Software Post-processing Error Code: SS000\*\*\*\*\*



**Software User Interface Error Code: SU000\*\*\*\*\***