

---

# FAULT FINDING

---

## Contents

### TEXT

	<b>Contents .....</b>	<b>3-1</b>
<b>1.</b>	<b>Format recognition on bucky frame .....</b>	<b>3-3</b>
<b>2.</b>	<b>Lust drive for bucky frame long./tilting and bucky frame park .....</b>	<b>3-4</b>
2.1.	Operating indication .....	3-4
<b>3.</b>	<b>Introduction .....</b>	<b>3-5</b>
3.1.	Abbreviations .....	3-5
3.2.	Error and event logging .....	3-6
3.2.1.	Properties of log buffers .....	3-6
3.2.2.	Overall design aspects .....	3-6
3.3.	Message overview .....	3-6
3.3.1.	Set XSCOPE log level .....	3-6
3.4.	Buffer and screen handling .....	3-7
3.4.1.	Log buffer handling .....	3-7
3.4.2.	Screen handling .....	3-7
3.5.	Layout of message items .....	3-8
3.5.1.	Entry number .....	3-8
3.5.2.	Time stamp .....	3-8
3.5.3.	Message level .....	3-8
3.5.4.	Message identification number .....	3-8
3.5.5.	Component identification description .....	3-9
<b>4.</b>	<b>Definition of error logging messages .....</b>	<b>3-10</b>
4.1.	SYSCO-Control (System Control SYCO) .....	3-10
4.2.	SYCO file access (System Control SYCO) .....	3-11
4.3.	SYSCO-CANCOM (System Control - CAN Communication CAL) .....	3-12
4.4.	SYSCO-SIGNALBUS (System Control - Signal Bus SIBI) .....	3-13
4.5.	UI-Control (User Interface - Control UICO) .....	3-14
4.6.	UI-GOC (User Interface - 1st Geometry Operator Console GOC) .....	3-14
4.7.	UI-GOC (User Interface - 2nd Geometry Operator Console GOC) .....	3-15
4.8.	UI-TSO (User Interface - Table Side Operation TSO) .....	3-16
4.9.	UI-THG (User Interface - Tube Handle Grip THG) .....	3-16
4.10.	UI-COCKPIT (User Interface -COCKPIT CUI) .....	3-17
4.11.	GEO-CONTROL (Geometry Control GECO / GECM) .....	3-18
4.12.	GEO-GCU (Geometry Controller Unit GCU) .....	3-19
4.13.	GEO-SC (Geometry - Serial Changer) .....	3-24
4.14.	GEO-COLLIMATOR (Geometry - Collimator BLD) .....	3-27
4.15.	DC-CONTROL (Digital Camera - Control DCCO) .....	3-30
4.16.	DC-CPX (Digital Camera - Central Part eXtended (Image detection) CPX) ..	3-31
4.17.	DC-IP (Digital Camera - Image Processing (LIM, DIM) DIM) .....	3-33
4.18.	XG-CONTROL (X-ray Generator Control XGCO) .....	3-34
4.19.	XG-SUBSYS (X-ray Generator Subsystem) .....	3-35
<b>5.</b>	<b>Definition of logging information (minimal messages) .....</b>	<b>3-35</b>
<b>6.</b>	<b>Definition of service logging messages .....</b>	<b>3-35</b>
6.1.	SYCO (System Control) .....	3-35

6.2.	UICO (User Interface Control) .....	3-36
6.3.	GEST (Geometry Stand Control) .....	3-38
6.4.	GECM (Geometry Collimation Control) .....	3-40
6.5.	IDCO (Image Detection Control) .....	3-41
6.6.	IPCO (Image Processing Control) .....	3-42

## 1. FORMAT RECOGNITION ON BUCKY FRAME

- see also Z1-9.1 Subsystem DuoDiagnost

Film cassette size [cm]	Film cassette size [inch]	Alternative dimension [cm]	Alternative dimension [inch]	Output voltage SVA2 X2:5 (x) [V]	Output voltage SVA2 X2:6 (y) [V]
13 x 18	5 x 7			2,57	3,58
15 x 40	6 x 16			3,0	8,0
	6,5 x 8,5			3,3	4,32
18 x 24	7 x 9,5			3,58	4,8
18 x 43	7 x 17			3,58	8,64
20 x 25	8 x 10	20 x 24	8 x 9,5	4,0	4,8
20 x 40	8 x 16			4,0	8,0
20 x 43	8 x 17			4,0	8,64
24 x 24	9,5 x 9,5			4,8	4,8
24 x 30	9,5 x 12			4,8	6,0
25 x 30	10 x 12	24 x 30	9,5 x 12	4,8	6,0
28 x 35	11 x 14			5,59	7,12
30 x 30	12 x 12			6,0	6,0
30 x 35	12 x 14			6,0	7,12
30 x 40	12 x 16			6,0	8,0
35 x 35	14 x 14			7,12	7,12
40 x 40	16 x 16			8,0	8,0
43 x 35	17 x 14			8,64	7,12

**2. LUST DRIVE FOR BUCKY FRAME  
long./tilting and bucky frame park**

**2.1. OPERATING INDICATION**

<b>H2</b> [green LED]	<b>H1</b> [red LED]	<b>Description</b>
OFF	OFF	Power off, no function
OFF	ON	Power is switched on, after 0.5 s Selftest, inverter ready
ON	OFF	inverter is started
ON	ON	Overload protection active
OFF	flashing	Error - Switch power OFF and ON (reset). If H1-LED is still flashing test for low-tension voltage. Otherwise exchange controller.

### 3. INTRODUCTION

This chapter defines the logging concept of errors and events for the duo DIAGNOST.

#### 3.1. ABBREVIATIONS

<b>BLD</b>	Beam Limitation Device
<b>CAN</b>	Controller Area Network
<b>CLL</b>	Control LED on front
<b>COCKPIT</b>	System Userinterface and Systemcontroller
<b>CPX</b>	Central Part X (Image Detection)
<b>CUI</b>	Cockpit User Interface
<b>D65</b>	OPTO1 printed circuit board
<b>D66</b>	“Switch board” for cassette tray connectors
<b>D71</b>	OPTO2 printed circuit board, transmitter
<b>D72</b>	OPTO2 printed circuit board, receiver
<b>D80</b>	Main control PCB with CPU
<b>D81</b>	PCB with grid oscillation electromagnet
<b>D82</b>	PCB with grid oscillation hall-sensor
<b>D83</b>	Front panel
<b>DE</b>	Development
<b>DIM</b>	Digital Image Memory (Image Processing)
<b>GCU</b>	Geometry Control Unit
<b>GEO</b>	Geometry control
<b>GEST</b>	Geometry stand control
<b>GM</b>	Grid motor
<b>GOC</b>	Geometry Operation Control
<b>GS</b>	Grid motor stop switch
<b>HW</b>	Hardware
<b>IOE</b>	Encoder on IOM motor
<b>IOM</b>	Cassette tray in/out motor (X-direction)
<b>IOS</b>	In/out button
<b>LE</b>	Encoder on LM motor
<b>LM</b>	Left side clamping device motor
<b>OPTO1</b>	Detector for inserted cassette
<b>OPTO2</b>	Detector for the cassette rear end
<b>RE</b>	Encoder on RM motor
<b>RM</b>	Right side clamping device motor
<b>RS</b>	Grid ready/start switch
<b>SB</b>	Signal bus
<b>SE</b>	Encoder on SM motor
<b>SM</b>	Shutter device motor
<b>SW</b>	Software
<b>SYS</b>	System controller
<b>THG</b>	Tube Hand Grip
<b>TSO</b>	Table Side Operation Control
<b>UI</b>	User interface
<b>URF</b>	Universal Radiography & Fluoroscopy

### 3.2. ERROR AND EVENT LOGGING

The duo Diagnost contains two logging buffer, one for error messages and one for error, service and debug messages.

Messages from following subsystems and components will be logged:

- System controller (SYSCO)
- Digital Camera Controller (DCCO) (CPX, DIM)
- User Interface Controller (UICO) (THG, GOC, TSO, COCKPIT)
- Geometry Controller (GECO) (BLD, GCU, SC)
- X-ray Generator Controller (XGCO) (Optimus C)

It is possible to select a subset of messages so the more important messages are logged only. This can be done by the user by selecting the logging level on XSCOPE.

#### 3.2.1. Properties of log buffers

The error file and the statistic file can be copied with an emergency tool from the Cockpit on to a disk.

The error buffer is saved in DD\_ERROR.LOG. It can only be cleared with XSCOPE by the service engineer.

The event buffer is saved in DD\_EVENT.LOG. It is cleared with XSCOPE by the service engineer and after each start of the system.

The system logging buffers can be read out with the service tool XSCOPE. Their contents are displayed either on the Cockpit screen or at the service notebook.

The windows on Cockpit can be enabled or disabled via XSCOPE and they can be cleared directly on the Cockpit.

All X-ray generator errors will be logged in System error buffer in cockpit.

The X-ray generator Optimus C contains a additional local error log buffer. It can be read out with the service tool XRG-SCOPE.

#### 3.2.2. Overall design aspects

The overall design of the error logging concept for the different types of components:

- Components with CAN connection to the System controller but without error buffer (COCKPIT, GOC, THG, TSO, GCU, BLD, CPX, DIM)
- Component with CAN connection to the System controller and with local error buffer (Optimus C)

### 3.3. MESSAGE OVERVIEW

<b>Fatal Error</b>	Message for severe error conditions
<b>Error</b>	Message for less severe error conditions
<b>Warning</b>	Message to show conditions which presumably could yield to problems
<b>Message</b>	General hint about system state

#### 3.3.1. Set XSCOPE log level

Log levels which can be selected by a service engineer with the service tool XSCOPE are

- Fatal Errors
- Errors
- Warnings
- Message and
- Service.

All but the service log level are non volatile, i.e. after the next power off/on sequence the XSCOPE log level is restored to its least recent value before service log level was selected.

### 3.4. BUFFER AND SCREEN HANDLING

The log buffer and the screens can be selected and erased separately.

#### 3.4.1. Log buffer handling

The error buffer and the event buffer can be read and cleared via XSCOPE. The file itself remains when cleared, but the contents is set to the default strings.

The event buffer is also cleared at power up.

The entry numbers always start with 1 after the buffers are cleared.

#### 3.4.2. Screen handling

The error buffer and the event screen on Cockpit can be enabled and disabled via XSCOPE. The open window can then be cleared via a button on Cockpit. It only clears the screen, it does not clear the error or event buffer itself. The entry number remains where it is.

When activating the error buffer, the occurring errors are written on the screen, but no previous errors are displayed.

When activating the event buffer, all events since the last power-up are displayed and any new occurring events are also displayed on the screen.

If a loglevel of any package is set to "debug" or "service" at runtime of the system, the event screen is also enabled and all messages since start-up are displayed.

If a loglevel of any package is set to "debug" or "service" as non-volatile value, the event screen is enabled at start-up and all messages since start-up are displayed.

All messages occurring before the event screen is enabled are queued. When the queue is full, the last messages (newest) are discarded.

### 3.5. LAYOUT OF MESSAGE ITEMS

The following items will be logged in the error resp. event buffer:

- Entry number
- Time stamp
- Message level
- Message identification number (optional)

#### 3.5.1. Entry number

The first item in the message is the continuous message entry number. This is a five character number from 00001 to 99999.

The error buffer is a ring buffer. The entry number will be increased up to 99999 and then it continues with 00001.

#### 3.5.2. Time stamp

The time information follows the entry number, separated by spaces.

Date / Time format (error buffer)

Layout: YY/MM/DD HH:MM:SS (Example: 96/12/26 08:15:01)

Delta Time format (event buffer, Cockpit display)

Layout: SSSSS:MMM (seconds:milliseconds). Smallest time unit = 20ms. (Example: 13:120)

#### 3.5.3. Message level

Log level Minimal is logged with -M-. All errors are classified in the error list.

#### 3.5.4. Message identification number

The message identification number is an eight character number for all error messages of class -F-, -E-, -W- and -M-.

Example: 03 1 01 007

				detail error identification (NVRAM is defect)
				component error number (Fatal Hardware Error)
				component identification (GCU)
				subsystem identification (Geometry)

The component error numbers and the detail error identifications are defined in the error definition table.

### 3.5.5. Component identification description

Comp. ID	Component	Description
<b>01 System controller</b>		
0	SYSCO - Control	General system controller functionality (hardware, router, XSCOPE, ...)
1	SYSCO - CANCOM	CAN communication (master functionality)
2	SYSCO - SIGNALBUS	Signal-Bus
3	SYSCO - Startup	Startup errors, before the SYCO.JOB is started
<b>02 User interface</b>		
0	UI-CONTROL	User interface control (UICO)
2	UI-GOC I	Geometry Operator Console stationary
3	UI-GOC II	Geometry Operator Console mobil
4	UI-TSO	Table Side Operation
6	UI-THG	Tube Handle Grip
8	UI-COCKPIT	Cockpit Console
<b>03 Geometry</b>		
0	GEO-CONTROL	Geometry control (GECO)
1	GEO-GCU	Geometry Controller Unit (GCU)
2	GEO-SC	Serial Changer
3	GEO-COLLIMATOR	Collimator (BLD)
<b>04 Digital Camera</b>		
0	DC-CONTROL	Digital Camera Control (DCCO)
1	DC-CPX	Image detection subsystem (CPX)
2	DC-IP	Image processing subsystem (LIM, DIM)
<b>06 X-ray generation</b>		
0	XG-CONTROL	X-ray control (XGCO)
1	XG-SUBSYS	X-ray generator subsystem (Optimus C)

## 4. DEFINITION OF ERROR LOGGING MESSAGES

### 4.1. SYSCO-CONTROL (SYSTEM CONTROL SYCO)

Error-ID 010 .. ...		Description	Possible reasons
... 01 0xx	<b>F</b>	SYS: SW: Intern:<detail error description>	
... 01 999	<b>W</b>	SYS: SW: Intern: <number> unknown error oc-cured	contact helpdesk Hamburg
... 02 001	<b>E</b>	SYS: DB: Config: <number> APR: invalid Aux. Dig. Memory	- Aux Dig. Camera not configured, but in APR dataset
... 02 002	<b>E</b>	SYS: DB: Config: <number> APR: invalid Aux. WallBucky	- Aux WallBucky not configured, but in APR dataset
... 02 003	<b>E</b>	SYS: DB: Config: <number> APR Cassette Split, no Ser.Changer	- Option Serial Changer not configured, but series exposures in APR dataset
... 02 004	<b>E</b>	SYS: DB: Config: <number> APR: Frame Rate for FREE CASS/WallBucky	- Option Serial Changer not configured, but series exposures in APR dataset
... 02 005	<b>E</b>	SYS: DB: Config: <number> APR: Cass Split for FREE CASS/WallBucky	- Option Serial Changer not configured, but series exposures in APR dataset
... 02 006	<b>E</b>	SYS: DB: Config: <number> APR :AEC-Mode ON for FREE CASS	- Option Serial Changer not configured, but series exposures in APR dataset
... 02 007	<b>E</b>	SYS: DB: Config: <number> APR: Aux. and Re-ceptor are different	- Option Serial Changer not configured, but series exposures in APR dataset
... 02 008	<b>E</b>	SYS: DB: Config: <number> Tomoangle for Aux. DIG/WB/FREE	- Option Serial Changer not configured, but series exposures in APR dataset
... 02 009	<b>E</b>	SYS: DB: Config:%ld APR: Frame Rate for Spotfilm more than 1/sec	- a too fast frame rate is configured
... 02 010	<b>E</b>	SYS: DB: Config:%ld APR: Spotfilm full size not with NOT PRESENT	- APR program has spotfilm full size configured, system has NOT PRESENT configured
... 03 001	<b>E</b>	SYS: SW: Appli i: no Generator Configuration available	- No Generator Configuration data from the generator can be loaded to the system controller. (Generator or communication defect)
... 03 002	<b>E</b>	SYS: SW: Appli: no System Configuration database available	- No database Configuration can be loaded to the system controller. (Windows problem, database corrupted)
... 03 003	<b>E</b>	SYS: SW: Appli: no Cockpit Userinterface avail.	- No Cockpit Userinterface there (Windows problem)
... 04 001	<b>E</b>	SYS: SW: BIOS: CMOS power was lost	- internal SW / HW error; contact helpdesk Hamburg
... 04 002	<b>E</b>	SYS: SW: BIOS: CMOS checksum error	- internal SW / HW error; contact helpdesk Hamburg
... 04 003	<b>E</b>	SYS: SW: BIOS: CMOS config does not match	- internal SW / HW error; contact helpdesk Hamburg
... 04 004	<b>E</b>	SYS: SW: BIOS: CMOS memory size does not match	- internal SW / HW error; contact helpdesk Hamburg
... 04 005	<b>E</b>	SYS: SW: BIOS: CMOS init failed	- internal SW / HW error; contact helpdesk Hamburg
... 04 006	<b>E</b>	SYS: SW: BIOS: CMOS time invalid	- internal SW / HW error; contact helpdesk Hamburg
... 04 007	<b>E</b>	SYS: SW: BIOS: <number> msecs file seek	- internal SW / HW error; contact helpdesk Hamburg
... 05 001	<b>W</b>	SYS: SW: Appli: last system off due to power fail.	- system was switched off by a power failure
... 05 002	<b>W</b>	SYS: SW: Intern: last system off due to watchdog alert	- internal SW error; contact helpdesk Hamburg
... 05 003	<b>W</b>	SYS: SW: Intern: last system off with CUI timeout	- internal SW error; contact helpdesk Hamburg
... 05 004	<b>W</b>	SYS: SW: Intern: last system off with DB timeout	- internal SW error; contact helpdesk Hamburg
... 09 001	<b>F</b>	SYS: SW: Intern: General Protection occurred (details: next power on)	- internal SW error; contact helpdesk Hamburg
... 09 002	<b>M</b>	SYS: SW: Intern: <text>	- internal SW error; contact helpdesk Hamburg
... 91 xxx	<b>F</b>	SYS: SW: Intern: <text>	contact helpdesk Hamburg

#### 4.2. SYCO FILE ACCESS (SYSTEM CONTROL SYCO)

Error-ID		Description	Possible reasons
<b>010 .. ..</b> ... 51 xxx	<b>E</b>	SYS: SW: Intern: <detail error description>	- SW update / first installation: OK - internal resource problem; contact helpdesk Hamburg - internal SW error; contact helpdesk Hamburg
... 52 101	<b>E</b>	SYS: SW: NVRAM: Length: static system data, load default	- internal SW problem - harddisk problem
... 52 201	<b>E</b>	SYS: SW: NVRAM: Length: dynamic system data, load default	- internal SW problem - harddisk problem
... 52 301	<b>E</b>	SYS: SW: NVRAM: Length: statistic data, load default	- internal SW problem - harddisk problem
... 53 101	<b>E</b>	SYS: SW: NVRAM: Checksum: static system data, load default	- system was switched off during service
... 53 201	<b>E</b>	SYS: SW: NVRAM: Checksum: dynamic system data , load default	- system was switched off during operation
... 54 101	<b>M</b>	SYS: SW: NVRAM: Version: static system data, load default	- SW update was done
... 54 102	<b>M</b>	SYS: SW: NVRAM: Version: dynamic system data, load default	- SW update was done
... 55 101	<b>M</b>	SYS: SW: NVRAM: Created: static system data, load default	- new system, or file was deleted
... 55 201	<b>M</b>	SYS: SW: NVRAM: Created: dynamic system data, load default	- new system, or file was deleted
... 55 301	<b>M</b>	SYS: SW: NVRAM: Created: statistic system data, load default	- new system, or file was deleted

### 4.3. SYSCO-CANCOM (System Control - CAN Communication CAL)

Error-ID 011 .. ...		Description	Possible reasons
... 01 xxx	<b>E</b>	SYS: CAN: Intern: <detail erroer description>	internal SW error; contact helpdesk Hamburg
... 01 037	<b>W</b>	SYS: CAN: Intern: <message> Msg_p_send	may occur with a disconnected node
... 01 999	<b>W</b>	SYS: CAN: Intern: unknown error occured	- contact helpdesk Hamburg
... 02 001	<b>E</b>	SYS: CAN: SW: Controller chip overrun	- CAN network error (faulty component) - internal resource problem; contact helpdesk Hamburg
... 02 002	<b>F</b>	SYS: CAN: HW: Controller chip bus off	- CAN network error (faulty network / component)
... 02 003	<b>E</b>	SYS: CAN: HW: Controller Chip error status	- CAN network error (faulty network / component)
... 02 004	<b>E</b>	SYS: CAN: SW: rx queue overrun	- CAN network error (faulty component) - internal resource problem; contact helpdesk Hamburg
... 02 005	<b>F</b>	SYS: CAN: SW: tx queue overrun	- CAN network error (faulty component) - internal resource problem; contact helpdesk Hamburg
... 02 006	<b>E</b>	SYS: CAN: SW: inhibit time queue overrun	- internal resource problem; contact helpdesk Hamburg
... 10 0xx xx=No- delID	<b>E</b>	SYS: CAN: network: <nodename> disconnected	- CAN network error (cableing) - component error (component reset)
... 11 0xx xx=No- delID	<b>M</b>	SYS: CAN: network: <nodename> restarted	-component available
... 12 0xx xx=No- delID	<b>F</b>	SYS: CAN: network: <nodename> absent	- CAN network error (cableing) - component error (component reset)
Node ID 00		System User Interface (cockpit)	
Node ID 01		Geometry Operation Control stationary (GOC I)	
Node ID 02		Table Side Operation (TSO)	
Node ID 03		Tube Hand Grip (THG)	
Node ID 04		Geometry Contol Unit (GCU)	
Node ID 05		Central Part X (CPX)	
Node ID 06		Generator	
Node ID 07		Collimator easy beam	
Node ID 08		Collimator NICOL	
Node ID 09		Digital Image Memory (DIM)	
Node ID 10		Serial changer	
Node ID 11		Geometry Operation Control mobil (GOC II)	

#### 4.4. SYSCO-SIGNALBUS (System Control - Signal Bus S/B)

Error-ID		Description	Possible reasons
012 .. ..			
... 01 001	F	SYS: SB: HW: EN_X signal set on at startup	Signalbus hardware error faulty component
... 01 002	E	SYS: SB: HW: RQ_SN_X signal set on at startup	Signalbus hardware error faulty component
... 01 003	E	SYS: SB: HW: CTRL_X signal set on at startup	Signalbus hardware error faulty component
... 01 004	E	SYS: SB: HW: RQ_M2_X signal set on at startup	Signalbus hardware error faulty component
... 01 005	E	SYS: SB: HW: RQ_M1_X signal set on at startup	Signalbus hardware error faulty component
... 01 006	E	SYS: SB: HW: NR_PR_X signal set off at startup	Signalbus hardware error faulty component
... 01 007	E	SYS: SB: HW: ACT_X signal set on at startup	Signalbus hardware error faulty component
... 01 008	E	SYS: SB: HW: EN_MV signal set on at startup	Signalbus hardware error faulty component
... 01 009	E	SYS: SB: HW: CTRL_I signal set on at startup	Signalbus hardware error faulty component
... 01 010	E	SYS: SB: HW: I_BUSY signal set on at startup	Signalbus hardware error faulty component
... 01 999	E	SYS: SB: internal error: unknown error occurred	contact helpdesk Hamburg
... 02 001	E	SYS: SB: HW: RQ_M1_X signal NOT reset to off	Signalbus hardware error faulty component
... 02 002	E	SYS: SB: HW: RQ_M1_X signal NOT reset to on	Signalbus hardware error faulty component
... 02 003	E	SYS: SB: HW: RQ_M2_X signal NOT reset to off	Signalbus hardware error faulty component
... 02 004	E	SYS: SB: HW: RQ_M2_X signal NOT reset to on	Signalbus hardware error faulty component
... 02 005	E	SYS: SB: HW: RQ_SN_X signal NOT reset to off	Signalbus hardware error faulty component
... 02 006	E	SYS: SB: HW: RQ_SN_X signal NOT reset to on	Signalbus hardware error faulty component
... 03 001	E	SYS: SB: HW: CTRL_X signal set on when acquisition idle	1. Signalbus hardware error 2. Internal Software error in CPX; contact helpdesk Hamb. faulty component
... 03 002	E	SYS: SB: HW: CTRL_I signal set on when acquisition idle	1. Signalbus hardware error 2. Internal Software error in CPX; contact helpdesk Hamb. faulty component
... 03 003	E	SYS: SB: HW: X_ACT signal set on when acquisition idle	Signalbus hardware error faulty component
... 03 004	E	SYS: SB: HW: NR_PR_X signal set off when acquisition idle	Signalbus hardware error faulty component

### 4.5. UI-Control (User Interface - Control *UICO*)

Error-ID 020 .. ...		Description	Possible reasons
... 01 001	<b>W</b>	UI:SYS:SW: Intern: CAN obj->GOC sel. mask task	internal SW error; contact helpdesk Hamburg
... 01 002	<b>W</b>	UI:SYS:SW: Intern: CAN obj->TSO sel. mask task	internal SW error; contact helpdesk Hamburg
... 01 003	<b>W</b>	UI:SYS:SW: Intern: CAN obj->GOC key task	internal SW error; contact helpdesk Hamburg
... 01 004	<b>W</b>	UI:SYS:SW: Intern: CAN obj->GOC joystick task	internal SW error; contact helpdesk Hamburg
... 01 005	<b>W</b>	UI:SYS:SW: Intern: CAN obj->TSO key task	internal SW error; contact helpdesk Hamburg
... 01 006	<b>W</b>	UI:SYS:SW: Intern: CAN obj->THG key task	internal SW error; contact helpdesk Hamburg
... 01 007	<b>W</b>	UI:SYS:SW: Intern: unknown CUI event status <event>	internal SW error; contact helpdesk Hamburg
... 01 008	<b>W</b>	UI:SYS:SW: Intern: CAN obj->GO2 sel. mask task	internal SW error; contact helpdesk Hamburg
... 00 999	<b>W</b>	UI: SYS:SW: unknown error received	contact helpdesk Hamburg

### 4.6. UI-GOC (User Interface - 1st Geometry Operator Console *GOC*)

Error-ID 022 .. ...		Description	Possible reasons
... 01 000	<b>F</b>	UI: GOC: HW: general error	GOC is defect
... 01 001	<b>F</b>	UI: GOC: HW: RAM test failed	GOC is defect
... 01 002	<b>F</b>	UI: GOC: HW: watchdog test failed	GOC is defect
... 01 003	<b>F</b>	UI: GOC: HW: power supply error	GOC is defect
... 02 000	<b>F</b>	UI: GOC: SW: general communication error	Component design error; contact helpdesk Hamburg
... 02 001	<b>F</b>	UI: GOC: SW: CAN chip communication error	Component design error; contact helpdesk Hamburg
... 10 001 .... ... 10 095	<b>E</b>	UI: GOC: HW: key <xxx> pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 11 001	<b>F</b>	UI: GOC: HW: tilting joystick pressed during startup	- Specific joystick is defect - Specific joystick is pressed during startup
... 11 002	<b>F</b>	UI: GOC: HW: move beam joystick pressed during startup	- Specific joystick is defect - Specific joystick is pressed during startup
... 20 001	<b>E</b>	UI: GOC: HW: tilting joystick out of range	Specific joystick is defect
... 20 002	<b>E</b>	UI: GOC: HW: move beam joystick out of range	Specific joystick is defect
... 50 001 .... ... 50 003	<b>E</b>	UI: GOC: SW: Intern: unknown para. request <xx>	Component design error; contact helpdesk Hamburg
... 90 000	<b>E</b>	UI: GOC: selection bit mask timeout	- timeout of the selection bit mask
... 99 000	<b>W</b>	UI: GOC: unknown error <xx/yy> received	- SW-versions incompatible - Internal SW error; contact helpdesk Hamburg

#### 4.7. UI-GOC (User Interface - 2nd Geometry Operator Console GOC)

Error-ID 023 .. ...		Description	Possible reasons
... 01 000	<b>F</b>	UI: GC2: HW: general error	GC2 is defect
... 01 001	<b>F</b>	UI: GC2: HW: RAM test failed	GC2 is defect
... 01 002	<b>F</b>	UI: GC2: HW: watchdog test failed	GC2 is defect
... 01 003	<b>F</b>	UI: GC2: HW: power supply error	GC2 is defect
... 02 000	<b>F</b>	UI: GC2: SW: general communication error	Component design error; contact helpdesk Hamburg
... 02 001	<b>F</b>	UI: GC2: SW: CAN chip communication error	Component design error; contact helpdesk Hamburg
... 10 001 .... ... 10 095	<b>E</b>	UI: GC2: HW: key <xxx> pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 11 001	<b>F</b>	UI: GC: HW: tilting joystick pressed during startup	- Specific joystick is defect - Specific joystick is pressed during startup
... 11 002	<b>F</b>	UI: GC2: HW: move beam joystick pressed during startup	- Specific joystick is defect - Specific joystick is pressed during startup
... 20 001	<b>E</b>	UI: GC2: HW: tilting joystick out of range	Specific joystick is defect
... 20 002	<b>E</b>	UI: GC2: HW: move beam joystick out of range	Specific joystick is defect
... 50 001 .... ... 50 003	<b>E</b>	UI: GC2: SW: Intern: unknown para. request <xx>	Component design error; contact helpdesk Hamburg
... 90 000	<b>E</b>	UI: GC2: selection bit mask timeout	- timeout of the selection bit mask
... 99 000	<b>W</b>	UI: GC2: unknown error <xx/yy> received	- SW-versions incompatible - Internal SW error; contact helpdesk Hamburg

### 4.8. UI-TSO (User Interface - Table Side Operation TSO)

Error-ID 024 .. ...		Description	Possible reasons
... 01 000	F	UI: TSO: HW: general error	TSO is defect
... 01 001	F	UI: TSO: HW: RAM test failed	TSO is defect
... 01 002	F	UI: TSO: HW: watchdog test failed	TSO is defect
... 01 003	F	UI: TSO: HW: power supply error	TSO is defect
... 02 000	E	UI: TSO: SW: general communication error	Component design error; contact helpdesk Hamburg
... 02 001	E	UI: TSO: SW: CAN ship communication error	Component design error; contact helpdesk Hamburg
... 10 005 .... ... 10 096	E	UI: TSO: HW: key <xxx>pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 50 001 ... 50 002	E	UI: TSO: SW: Intern: unknown para. request <xx>	Component design error; contact helpdesk Hamburg
... 90 000	E	UI: TSO: selection bit mask timeout	- timeout of the selection bit mask
... 99 000	W	UI: TSO: unknown error <xx/yy> received	- SW-versions incompatible - Internal SW error; contact helpdesk Hamburg

### 4.9. UI-THG (User Interface - Tube Handle Grip THG)

Error-ID 026 .. ...		Description	Possible reasons
... 01 000	F	UI: THG: HW: general error	THG is defect
... 01 001	F	UI: THG: HW: RAM test failed	THG is defect
... 01 002	F	UI: THG: HW: watchdog test failed	THG is defect
... 01 003	F	UI: THG: HW: power supply error	THG is defect
... 02 000	E	UI: THG: SW: general communication error	Component design error; contact helpdesk Hamburg
... 02 001	E	UI: THG: SW: CAN ship communication error	Component design error; contact helpdesk Hamburg
... 10 005 .... ... 10 096	E	UI: THG: HW: key <xxx>pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 50 001 ... 50 002	E	UI: THG: SW: Intern: unknown para. request <xx>	Component design error; contact helpdesk Hamburg
... 99 000	W	UI: THG: unknown error <xx/yy> received	- SW-versions incompatible - Internal SW error; contact helpdesk Hamburg

#### 4.10. UI-COCKPIT (User Interface -COCKPIT CUI)

Error-ID		Description	Possible reasons
028 .. ...			
... 00 001	E	UI:CUI:HW: preparation key pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 00 002	E	UI:CUI:HW: exposure key pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 00 003	E	UI:CUI:HW: fluoroscopy key pressed during startup	- Specific key is defect - Specific key is pressed during startup
... 00 100	E	UI:CUI:SW: Corrupt config file: <filename>	- internal SW problem - harddisk problem - system was switched off during file access
... 00 101	E	UI:CUI:SW: Database corrupt: <APR database name>	- internal SW problem - harddisk problem - system was switched off during file access
... 00 102	E	UI:CUI:SW: Database problem: <Config database name>	- internal SW problem - harddisk problem - system was switched off during file access
... 00 103	E	UI:CUI:SW: Database corrupt: <Config database name>	- internal SW problem - harddisk problem - system was switched off during file access
... 00 104	E	UI:CUI:SW: Database error	- internal SW problem - harddisk problem - system was switched off during file access
... 00 105	E	UI:CUI:SW: Resource library DLL error	- internal SW problem - harddisk problem - system was switched off during file access
... 00 106	E	UI:CUI:SW: Port driver DLL error	- internal SW problem - harddisk problem - system was switched off during file access
... 00 107	E	UI:CUI:HW: Key pressed at startup	- Specific key is defect - Specific key is pressed during startup
... 00 108	E	UI:CUI:SW: Database backup error	- internal SW problem - harddisk problem - system was switched off during file access
... 00 109	E	UI:CUI:SW: Bitmap file problem	- internal SW problem - harddisk problem - system was switched off during file access
... 00 999	E	UI:CUI:SW: Keyhook DLL error	- internal SW problem - harddisk problem - system was switched off during file access
... 99 999	E	UI:CUI: unknown error <xx/yy> received	- Internal SW error; contact helpdesk Hamburg

**4.11. GEO-CONTROL (Geometry Control *GECO* / *GECM*)**

<b>Error-ID</b> <b>030 .. ...</b>		<b>Description</b>	<b>Possible reasons</b>
... 10 001	<b>W</b>	GEO: SYS: SW: Intern: GCU_EVENT/ERROR mbx/unknown obj-id rxd	Internal SW error; contact helpdesk Hamburg
... 10 002	<b>W</b>	GEO: SYS: SW: Intern: GCU_ACT_VAL mbx/un- known obj-id rxd	Internal SW error; contact helpdesk Hamburg
... 10 003	<b>W</b>	GEO: SYS: SW: Intern: GCU_BRAKSTAT mbx/un- known obj-id rxd	Internal SW error; contact helpdesk Hamburg
... 10 010	<b>W</b>	GEO: SYS: DB: Intern: invalid APR layerheight	Internal SW error; contact helpdesk Hamburg
... 10 011	<b>W</b>	GEO: SYS: DB: Intern: invalid APR spotfilm size	Internal SW error; contact helpdesk Hamburg
... 10 999	<b>W</b>	GEO: SYS: SW: Intern: unknown error <number> occured in GEST	Internal SW error; contact helpdesk Hamburg
<hr/>			
... 20 001	<b>W</b>	GEO: SYS: SW: Intern: GECM <number> unknown msg	Internal SW error; contact helpdesk Hamburg
... 20 010	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> sec_error_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 011	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> sec_event_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 012	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> sec_position_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 013	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> gcu_cass_format_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 020	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> blu_sh_pos_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 021	<b>W</b>	GEO: SYS: SW: Intern: unknown evt <number> blu_event_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 022	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> blu_event_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 023	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> blu_error_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 030	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> bld_nicol_sh_pos_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 031	<b>W</b>	GEO: SYS: SW: Intern: unknown evt <number> bld_nicol_event_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 032	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> bld_nicol_event_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 033	<b>W</b>	GEO: SYS: SW: Intern: unknown obj <number> bld_nicol_error_rx_task	Internal SW error; contact helpdesk Hamburg
... 20 040	<b>F</b>	GEO: SYS: SW: Intern: unknown BLU-type, no collimation	Internal SW error; contact helpdesk Hamburg
... 20 050	<b>F</b>	GEO: SYS: SW: Collimator busy timeout	No response on a command from the sysco to the Collimator within timeout when a new command is sent.
... 20 999	<b>W</b>	GEO: SYS: SW: Intern: <number> occured in GECM	Internal SW error; contact helpdesk Hamburg

## 4.12. GEO-GCU (Geometry Controller Unit GCU)

Error-ID		Description	Possible reasons
<b>031 .. ..</b>			
... 01 001	F	GEO: GCU: HW: ROM test failed	- EPROM(s) defect
... 01 002	F	GEO: GCU: HW: RAM test failed	- RAM(s) defect
... 01 003	F	GEO: GCU: HW: watchdog timeout	- Can be caused by short system switch OFF to switch ON time - Interference on data / address bus on SGCU card
... 01 004	F	GEO: GCU: HW: unexpected interrupt	- Can be caused by short system switch OFF to switch ON time - Interference on data / address bus on SGCU card
... 01 005	F	GEO: GCU: HW: unexpected interrupt	- Can be caused by short system switch OFF to switch ON time - Interference on data / address bus on SGCU card
... 01 006	F	GEO: GCU: HW: unexpected interrupt	- Can be caused by short system switch OFF to switch ON time - Interference on data / address bus on SGCU card
... 01 007	E	GEO: GCU: HW: NVRAM defect	- NVRAM defect or missing
... 01 008	F	GEO: GCU: HW: Power supply dervoltageun	- Power supply error U1 < 19.5V
... 02 001	F	GEO: GCU: SW: watchdog timeout	- Software crash
... 02 002	F	GEO: GCU: SW: stack underflow	- Software crash
... 02 003	F	GEO: GCU: SW: stack overflow	- Software crash
... 03 001	F	GEO: GCU: HW: no operation of AD-converter	- AD-Converter defect - $\pm 10V$ reference shorted to GND - +24V-U1 sinks lower than 17V
... 10 000	F	GEO: GCU: watchdog test failed during startup	- CPU defect
... 11 001	E	GEO: GCU: NVRAM test failed during startup: configuration section	- bad NVRAM data or version
... 11 002	E	GEO: GCU: NVRAM test failed during startup: adjustment section	- bad NVRAM data or version
... 11 003	E	GEO: GCU: NVRAM test failed during startup: application section	- bad NVRAM data or version
... 12 001	F	GEO: GCU: K1 relay (MAINSAFETY): stuck on during startup	- Relay defect or incorrect wiring
... 12 002	E	GEO: GCU: K1 relay (MAINSAFETY): stuck off during startup	- GOC movement stop switch active - Relay defect or incorrect wiring - Safety circuit broken - Tube vertical in upper position
... 13 001	F	GEO: GCU: K2 relay (DEADMAN): stuck on during startup	- Relay defect or incorrect wiring
... 14 001	F	GEO: GCU: K3 relay (DEADMAN): stuck on during startup	- Relay defect or incorrect wiring
... 15 001	F	GEO: GCU: K4 relay (COLLISION): stuck on during startup	- Relay defect (SC100)

<b>Error-ID</b>		<b>Description</b>	<b>Possible reasons</b>
<b>031 .. ...</b>			
... 16 001	F	GEO: GCU: K5 relay (EN_MV): stuck on during startup	- Relay defect (SC100) - EN_MV active during startup
... 17 001	F	GEO: GCU: K7 relay (EN_X): stuck on during startup	- Relay defect (SC210) or SC210 missing - EN_X active during startup
... 18 001	E	GEO: GCU: K8 relay (connect EN_X-EN_MV): stuck on during startup	- Relay defect (SC210) or SC210 missing
... 18 002	F	GEO: GCU: K8 relay (connect EN_X-EN_MV): stuck off during startup	- Relay defect (SC210)
... 19 001	F	GEO: GCU: Power supply overvoltage during startup	- Power supply defect
... 20 001	F	GEO: GCU: K6 relay (BFP): stuck on during startup	- Relay defect or incorrect wiring
... 20 002	F	GEO: GCU: K6 relay (BFP): stuck off during startup	- Relay defect or incorrect wiring - K2 stuck ON
... 21 001	W	GEO: GCU: table tilt axis: frequency convertor reset	- Frequency converter error, e.g. overload, overcurrent
... 21 002	F	GEO: GCU: table tilt axis: frequency convertor failed	- Frequency converter not responding - Frequency converter not powered up
... 21 003	W	GEO: GCU: Bucky frame long axis: frequency convertor reset	- Frequency converter error, e.g. overload, overcurrent
... 21 004	F	GEO: GCU: Bucky frame long axis: frequency convertor failed	- Frequency converter not responding - Frequency converter not powered up
... 22 001	F	GEO: brake output monitor error: tilting brake off	- Connection to brake broken - Driver (SC100) defect
... 22 002	F	GEO: brake output monitor error: II long. brake off	- Connection to brake broken - Driver (SC100) defect
... 22 003	F	GEO: brake output monitor error: Bucky frame long brake off	- Connection to brake broken - Driver (SC100) defect
... 23 001	F	GEO: GCU: power supply: voltage too high	- Power supply defect
... 24 001	E	GEO: GCU: couple status error: undefined status	- Only one of two sensors active
... 25 001	E	GEO: GCU: Compressor force sensor error: force discrepancy	- Check force sensors using service tool, any sensor can be stuck on or stuck off.
... 26 001	E	GEO: GCU: Cassette detection: switch and format mismatch	- Cassette present sensor defect - Analogue sensing defect
... 27 001	E	GEO: GCU: Angulate beam: switch and calculated angle mismatch	- Switch defect or not adjusted
... 28 001	F	GEO: GCU: Bucky frame park: switch and measured position mismatch	- Switch defect or not adjusted
... 30 001	F	GEO: GCU: tabletop lateral: overspeed detected	- Potentiometer velocity too high

Error-ID		Description	Possible reasons
031 .. ...			
... 30 002	F	GEO: GCU: table tilt: overspeed detected	- Potentiometer velocity too high
... 30 003	F	GEO: GCU: move beam: overspeed detected	- Tachometer velocity too high
... 30 004	F	GEO: GCU: angulate beam: overspeed detected	- Tachometer velocity too high
... 30 005	F	GEO: GCU: Bucky frame park: overspeed detected	- Potentiometer velocity too high
... 30 006	F	GEO: GCU: Fulcrum frontal: overspeed detected	- Potentiometer velocity too high
... 30 007	F	GEO: GCU: Compressor: overspeed detected	- Potentiometer velocity too high
...			
... 31 001	F	GEO: GCU: tabletop lateral: jam error	- Axis position does not change
... 31 002	F	GEO: GCU: table tilt: jam error	- Axis position does not change
... 31 003	F	GEO: GCU: move beam: jam error	- Axis position does not change
... 31 004	F	GEO: GCU: angulate beam: jam error	- Axis position does not change
... 31 005	F	GEO: GCU: Bucky frame park: jam error	- Axis position does not change
... 31 006	F	GEO: GCU: Fulcrum frontal: jam error	- Axis position does not change
... 31 007	F	GEO: GCU: Compressor: jam error	- Axis position does not change
...			
... 34 001	F	GEO: GCU: AD-input out of range: table tilt position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 002	F	GEO: GCU: AD-input out of range: Bucky frame park position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 003	F	GEO: GCU: AD-input out of range: Bucky frame long. position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 004	F	GEO: GCU: AD-input out of range: II long. position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 005	F	GEO: GCU: AD-input out of range: tabletop lateral position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 006	F	GEO: GCU: AD-input out of range: Fulcrum position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 007	F	GEO: GCU: AD-input out of range: Compressor position	- Connection to potentiometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 008	F	GEO: GCU: AD-input out of range: Table Bucky Cassette X	- Connection to cassette sensing broken - Analogue input shorted to $\pm 10v$ reference
... 34 009	F	GEO: GCU: AD-input out of range: Bucky frame park velocity	- Connection to tachometer broken <i>not yet implemented</i> - Analogue input shorted to $\pm 10v$ reference
... 34 010	F	GEO: GCU: AD-input out of range: Bucky frame long. velocity	- Connection to tachometer broken - Analogue input shorted to $\pm 10v$ reference
... 34 011	F	GEO: GCU: AD-input out of range: Table Bucky Cassette Y	- Connection to cassette sensing broken - Analogue input shorted to $\pm 10v$ reference
... 34 012	F	GEO: GCU: AD-input out of range: U1 check voltage	- Check voltage U1 at SC100X1:C13 < 3,9V $\Delta$ U1<19.5 V check cabling, power supply
...			
... 35 001	F	GEO: GCU: tabletop lat.: movement into wrong direction	- Potentiometer velocity in wrong direction
... 35 002	F	GEO: GCU: table tilt: movement into wrong direction	- Potentiometer velocity in wrong direction
... 35 003	F	GEO: GCU: move beam: movement into wrong direction	- Tachometer velocity in wrong direction
... 35 004	F	GEO: GCU: angulate beam: movement into wrong direction	- Tachometer velocity in wrong direction
... 35 005	F	GEO: GCU: Bucky frame park: movement into wrong direction	- Potentiometer velocity in wrong direction
... 35 006	F	GEO: GCU: Fulcrum frontal: movement into wrong direction	- Potentiometer velocity in wrong direction

<b>Error-ID</b>		<b>Description</b>	<b>Possible reasons</b>
<b>031 .. ...</b>			
... 35 007	F	GEO: GCU: Compressor: movement into wrong direction	- Potentiometer velocity in wrong direction
... 36 001	F	GEO: GCU: tabletop lateral: undemanded movement	- Axis position change detected without move request
... 36 002	F	GEO: GCU: table tilt: undemanded movement	- Axis position change detected without move request
... 36 003	F	GEO: GCU: move beam: undemanded movement	- Axis position change detected without move request
... 36 004	F	GEO: GCU: angulate beam: undemanded movement	- Axis position change detected without move request
... 36 005	F	GEO: GCU: Bucky frame park: undemanded movement	- Axis position change detected without move request
... 36 006	F	GEO: GCU: Fulcrum frontal: undemanded movement	- Axis position change detected without move request
... 36 007	F	GEO: GCU: Compressor: undemanded movement	- Axis position change detected without move request
... 37 003	F	GEO: GCU: tacho monitoring error: move beam	- Tachometer belt broken
... 37 004	F	GEO: GCU: tacho monitoring error: angulate beam	- Tachometer belt broken
... 37 005	F	GEO: GCU: tacho monitoring error: bucky frame park	- Tachometer belt broken
... 38 001	W	GEO: GCU: Tube vertical: switch and calculated position mismatch warning	- Reference switch not correctly adjusted - Positions of axes incorrect or not adjusted - Mechanical play / tolerances
... 38 002	F	GEO: GCU: Tube vertical: switch and calculated position mismatch	- Reference switch defect - Positions of axes incorrect or not adjusted - Mechanical play / tolerances
... 40 001	F	GEO: GCU: K1 relay: active but disabled by SW	- Relay defect or incorrect wiring
... 40 002	E	GEO: GCU: K1 relay: inactive due to safety circuit	- Relay defect or incorrect wiring - Safety circuit broken - Tube vertical in upper position
... 41 001	F	GEO: GCU: K2 relay: active but disabled by SW	- Relay defect or incorrect wiring
... 41 002	F	GEO: GCU: K2 relay: disabled by EN_MV	- Relay defect or incorrect wiring
... 41 003	F	GEO: GCU: K2 relay: active but disabled by EN_MV	- Relay defect or incorrect wiring
... 41 004	F	GEO: GCU: K2 relay: active but disabled by K4	- Relay defect or incorrect wiring
... 41 005	F	GEO: GCU: K2 relay: inactive but enabled by SW	- Relay defect or incorrect wiring
... 42 001	F	GEO: GCU: K3 relay: active but disabled by SW	- Relay defect or incorrect wiring
... 42 002	F	GEO: GCU: K3 relay: disabled by EN_MV	- Relay defect or incorrect wiring
... 42 003	F	GEO: GCU: K3 relay: active but disabled by EN_MV	- Relay defect or incorrect wiring
... 42 004	F	GEO: GCU: K3 relay: active but disabled by K4	- Relay defect or incorrect wiring
... 42 005	F	GEO: GCU: K3 relay: inactive but enabled by SW	- Relay defect or incorrect wiring
... 43 001	E	GEO: GCU: K8 relay (connect EN_X-EN_MV): active but disabled by SW	- Relay defect (SC210) or SC210 missing
... 43 002	F	GEO: GCU: K8 relay (connect EN_X-EN_MV): inactive but enabled by SW	- Relay defect (SC210) or SC210 missing
... 44 001	F	GEO: GCU: K6 relay (BFP): active but disabled by SW	- Relay defect or incorrect wiring

<b>Error-ID</b>		<b>Description</b>	<b>Possible reasons</b>
<b>031 .. ...</b>			
... 44 002	<b>F</b>	GEO: GCU: K6 relay (BFP): inactive but enabled by SW	- Relay defect or incorrect wiring - K2 stuck ON
... 50 001	<b>W</b>	GEO: GCU: movement not possible: Compressor not configured	- Compressor not configured - Configuration data not downloaded to GCU
... 60 000	<b>W</b>	GEO: GCU: SW: internal buffer overflow: buffer-ID XXX	- Software error
... 61 001	<b>W</b>	GEO: GCU: configuration error: configuration data not rxd	- Configuration data not downloaded to GCU
... 70 001	<b>W</b>	GEO: GCU: NVRAM is not write protected	- NVRAM must be write protected (SC100)
... 72 001	<b>E</b>	GEO: GCU: NVRAM data overwritten with default data: configuration section	- Default data loaded into NVRAM. Data was bad or version incorrect.
... 72 002	<b>E</b>	GEO: GCU: NVRAM data overwritten with default data: adjustment section	- Default data loaded into NVRAM. Data was bad or version incorrect.
... 72 003	<b>E</b>	GEO: GCU: NVRAM data overwritten with default data: application section	- Default data loaded into NVRAM. Data was bad or version incorrect.
... 81 001	<b>E</b>	GEO: GCU: SRP error: switch activ, but bucky frame not in Expo position	- Switch defect or position recognition failed
... 81 002	<b>F</b>	GEO: GCU: SRP error: switch not activ, but bucky frame in Expo position	- Switch defect or position recognition failed
... 82 002	<b>E</b>	GEO: GCU: Coupling Rod: Decouple without request or manual	- Mechanical problems with Coupling Rod - User did decouple mechanicly
... 98 000	<b>F</b>	GEO: GCU: no selection mask received, axis XXX	- Software error (SYSCO or User interface) - CAN bus disconnected from GCU or User interface
... 99 000	<b>W</b>	GEO: GCU: unknown error YY XXX received	- Internal SW error. Contact helpdesk Hamburg

### 4.13. GEO-SC (Geometry - Serial Changer)

Error ID 032 .. ...		Description	Possible reason
... 01 001	F	GEO: SEC: HW: ROM test failed	- EPROM defect, exchange IC4
... 01 002	F	GEO: SEC: HW: RAM test failed	- RAM defect, exchange main board D80
... 01 003	F	GEO: SEC: HW: watchdog test failed	- hardware defect, exchange main board D80
... 01 004	E	GEO: SEC: HW: watchdog timeout	- Internal software error, see REMARK #
... 01 005	E	GEO: SEC: HW: unexpected NMI	- Internal software error, see REMARK #
... 01 006	E	GEO: SEC: HW: unexpected class B interrupt	- Internal software error, see REMARK #
... 01 007	E	GEO: SEC: HW: unexpected other interrupt	- Internal software error, see REMARK #
... 02 001	F	GEO: SEC: SW: watchdog timeout	- Internal software error, see REMARK #
... 02 002	F	GEO: SEC: SW: stack underflow	- Internal software error, see REMARK #
... 02 003	F	GEO: SEC: SW: stack overflow	- Internal software error, see REMARK #
... 10 001	F	GEO: SEC: Cassette detection: switch and format mismatch	- cassette present detected, but no format recognized - check OPTO1 (D65-3) for defect or dust via LED LD4 on D80 board – is ON if cassette is present - check OPTO2 (D71-72) for defect or dust via LED LD5 on D80 board – is ON while loading / ejecting the cassette
... 11 001	F	GEO: SEC: Key pressed during startup: IO switch	- check I/O switch D83-1 - I/O button pressed during system / SEC start up
... 20 001	E	GEO: SEC: Timeout: Adjustment of IOM not started on command	- Internal software error, see REMARK #
... 20 002	E	GEO: SEC: Timeout: Adjustment of LM/RM not started on command	- Internal software error, see REMARK #
... 20 003	E	GEO: SEC: Timeout: Adjustment of SM not started on command	- Internal software error, see REMARK #
... 20 004	E	GEO: SEC: Timeout: Adjustment of GM not started on command	- Internal software error, see REMARK #
... 21 001	E	GEO: SEC: Timeout: Adjustment of IOM not finished	- Adjustment failed , see further error messages
... 21 002	E	GEO: SEC: Timeout: Adjustment of LM/RM not finished	- Adjustment failed , see further error messages
... 21 003	E	GEO: SEC: Timeout: Adjustment of SM not finished	- Adjustment failed , see further error messages
... 21 004	E	GEO: SEC: Timeout: Adjustment of GM not finished	- Adjustment failed , see further error messages
... 22 001	E	GEO: SEC: Timeout: Movement of IOM not started on command	- Movement failed , see further error messages
... 22 002	E	GEO: SEC: Timeout: Movement of LM/RM not started on command	- Movement failed , see further error messages
... 22 003	E	GEO: SEC: Timeout: Movement of SM not started on command	- Movement failed , see further error messages
... 22 004	E	GEO: SEC: Timeout: Movement of GM not started on command	- Movement failed , see further error messages

REMARKS: # answer following two questions before calling helpdesk Hamburg:

1. Is this error number reproducible ? YES / NO
2. If YES, how is this error number reproducible ?

Error ID 032 .. ...		Description	Possible reason
... 23 001	E	GEO: SEC: Timeout: Movement of IOM not finished	- Movement failed , see further error messages
... 23 002	E	GEO: SEC: Timeout: Movement of LM/RM not finished	- Movement failed , see further error messages
... 23 003	E	GEO: SEC: Timeout: Movement of SM not finished	- Movement failed , see further error messages
... 23 004	E	GEO: SEC: Timeout: Movement of GM not finished	- Movement failed , see further error messages
...			
... 24 000	E	GEO: SEC: SW: internal buffer overflow: buffer-ID XXX	- Internal software error, contact helpdesk Hamburg
...			
... 30 001	F	GEO: SEC: Mech. or electr. error: IOM Motor unexpected stop	- motor blocked during movement (e.g. user, amplifier mechanics, IOM gear screw touches belt holding etc.) - high friction on rails - cabling defective - D80 main board defective - power supply fault - IOM encoder fault
... 30 002	F	GEO: SEC: Mech. or electr. error: LM Motor unexpected stop	- motor blocked during movement - right motor belt broken - cabling defective - D80 main board defective - power supply fault - LM encoder fault
... 30 003	F	GEO: SEC: Mech. or electr. error: RM Motor unexpected stop	- motor blocked during movement - left motor belt broken - cabling defective - D80 main board defective - power supply fault - RM encoder fault
... 30 004	F	GEO: SEC: Mech. or electr. error: SM Motor unexpected stop	- motor blocked during movement - high friction on rails - cabling defective - D80 main board defective - power supply fault - SM encoder fault
...			
... 31 001	F	GEO: SEC: Mech. or electr. error: IOM Motor moved too far	- belt broken - check the drive
... 31 002	F	GEO: SEC: Mech. or electr. error: LM Motor moved too far	- belt broken - check the drive
... 31 003	F	GEO: SEC: Mech. or electr. error: RM Motor moved too far	- belt broken - check the drive
... 31 004	F	GEO: SEC: Mech. or electr. error: SM Motor moved too far	- belt broken - check the drive
...			
... 32 001	F	GEO: SEC: Mech. or electr. error: IOM Motor not started	- motor blocked / defect - faulty cabling / flat cable - D80 main board defective - power supply fault - IOM encoder fault

Error ID 032 .. ...		Description	Possible reason
... 32 002	F	GEO: SEC: Mech. or electr. error: LM Motor not started	<ul style="list-style-type: none"> <li>- motor blocked / defect</li> <li>- faulty cabling / flat cable</li> <li>- right motor belt broken</li> <li>- D80 main board defective</li> <li>- power supply fault</li> <li>- LM encoder fault</li> </ul>
... 32 003	F	GEO: SEC: Mech. or electr. error: RM Motor not started	<ul style="list-style-type: none"> <li>- motor blocked / defect</li> <li>- faulty cabling / flat cable</li> <li>- left motor belt broken</li> <li>- D80 main board defective</li> <li>- power supply fault</li> <li>- RM encoder fault</li> </ul>
... 32 004	F	GEO: SEC: Mech. or electr. error: SM Motor not started	<ul style="list-style-type: none"> <li>- motor blocked / defect</li> <li>- faulty cabling</li> <li>- D80 main board defective</li> <li>- power supply fault</li> <li>- SM encoder fault</li> </ul>
... 35 001	E	GEO: SEC: Mech. or electr. error: Grid started without command	<ul style="list-style-type: none"> <li>- grid drive mechanism</li> <li>- ready switch RS and cabling</li> <li>- D80 main board defective</li> </ul>
... 35 002	F	GEO: SEC: Mech. or electr. error: Grid not started on command	<ul style="list-style-type: none"> <li>- motor or mechanism blocked / defect</li> <li>- faulty cabling</li> <li>- D80 main board defective</li> <li>- D80 Connectors X12 and X13 switched!!</li> <li>- hall sensor (D82) defect</li> <li>- missing magnet in grid "finger"</li> </ul>
... 35 003	F	GEO: SEC: Mech. or electr. error: Grid stop position not reached	<ul style="list-style-type: none"> <li>- loose / defect stop switch GS</li> <li>- motor blocked / defect</li> <li>- faulty cabling</li> <li>- D80 main board defective</li> </ul>
... 35 004	F	GEO: SEC: Mech. or electr. error: Grid ready position not reached	<ul style="list-style-type: none"> <li>- loose / defect ready switch RS</li> <li>- motor blocked / defect</li> <li>- faulty cabling</li> </ul>
... 35 005	E	GEO: SEC: Mech. or electr. error: Grid continuous mode doesn't work	<ul style="list-style-type: none"> <li>- electromagnet D81 distance to hall sensor D82 too large</li> <li>- table vibrations</li> <li>- movement blocked (swing stops) by amplimat cable / chamber</li> </ul>
... 37 001	F	GEO: SEC: Mech. or electr. error: Opto 2 failed (no light)	<ul style="list-style-type: none"> <li>- OPTO2 sensor blocked / defect / connection problem, check OPTO2 (D71-72) for defect or dust via LED LD5 on D80 board – must be ON while loading cass.</li> <li>- IOM belt broken during last movement</li> <li>- invalid cassette format used</li> </ul>
... 39 001	F	GEO: SEC: Cassette centering on y-axis failed	<ul style="list-style-type: none"> <li>- bar blocks during insertion</li> </ul>
... 51 001	F	GEO: SEC: SW error: Wrong context in one Damgaard task	<ul style="list-style-type: none"> <li>- Internal software error, contact helpdesk Hamburg</li> </ul>
... 99 000	W	GEO: SEC: unknown error YY XXX received	<ul style="list-style-type: none"> <li>- Internal software error, contact helpdesk Hamburg</li> </ul>

#### 4.14. GEO-COLLIMATOR (Geometry - Collimator *BLD*)

Error-ID 033 .. ...		Description	Possible reasons
... 01 001	F	GEO: BLD: HW: ROM test failed	- BLD-EPROM defect
... 01 002	F	GEO: BLD: HW: RAM test failed	- BLD-RAM defect
... 01 003	F	GEO: BLD: HW: HW Watchdog test	- BLD-WATCHDOG defect
... 01 004	F	GEO: BLD: HW: CAN test	- BLD-CAN-CHIP defect
... 01 005	F	GEO: BLD: HW: Power supply test failed	- BLD-POWER-SUPPLY test 11V failed
... 02 001	F	GEO: BLD: HW: watchdog timeout	- BLD -SOFTWARE crash or Internal SW error caused HW- watchdog timeout
... 02 002	E	GEO: BLD: SW: unexpected interrupt	- BLD unexpected interrupt occurred caused by SW error or noise
... 02 003	E	GEO: BLD: SW: unexpected interrupt	- BLD unexpected interrupt occurred caused by SW error or noise
... 02 004	E	GEO: BLD: SW: unexpected interrupt	- BLD unexpected interrupt occurred caused by SW error or noise
... 02 005	F	GEO: BLD: SW: watchdog timeout	- BLD -SOFTWARE crash or Internal SW error caused SW-watchdog timeout
... 02 006	F	GEO: BLD: SW: stack underflow	- BLD-SOFTWARE crash or Internal SW error caused STACK underflow
... 02 007	F	GEO: BLD: SW: stack overflow	- BLD-SOFTWARE crash or Internal SW error caused STACK overflow
... 03 001	E	GEO: BLD: SW: CAN: RX-overflow indication	- BLD COMMUNICATION error caused by receive overrun
... 03 002	E	GEO: BLD: SW: CAN: TX-overflow indication	- BLD COMMUNICATION error caused by transmit overrun
... 05 001	F	GEO: BLD: HW: X-motor: test max. voltage failed	- BLD MOTOR HARDWARE error
... 05 002	F	GEO: BLD: HW: Y-motor: test max. voltage failed	- BLD MOTOR HARDWARE error
... 05 003	F	GEO: BLD: HW: IRIS-motor: test max. voltage failed	- BLD MOTOR HARDWARE error
... 05 004	F	GEO: BLD: HW: Filter-motor: test max. voltage failed	- BLD MOTOR HARDWARE error
... 06 001	F	GEO: BLD: HW: X-motor: test min. voltage failed	- BLD MOTOR HARDWARE error
... 06 002	F	GEO: BLD: HW: Y-motor: test min. voltage failed	- BLD MOTOR HARDWARE error
... 06 003	F	GEO: BLD: HW: IRIS-motor: test min. voltage failed	- BLD MOTOR HARDWARE error
... 06 004	F	GEO: BLD: HW: Filter-motor: test min. voltage failed	- BLD MOTOR HARDWARE error
... 07 001	F	GEO: BLD: HW: X-motor: test zero voltage failed	- BLD MOTOR HARDWARE error
... 07 002	F	GEO: BLD: HW: Y-motor: test zero voltage failed	- BLD MOTOR HARDWARE error
... 07 003	F	GEO: BLD: HW: IRIS-motor: test zero voltage failed	- BLD MOTOR HARDWARE error
... 07 004	F	GEO: BLD: HW: Filter-motor: test zero voltage failed	- BLD MOTOR HARDWARE error

<b>Error-ID</b> <b>033 .. ...</b>		<b>Description</b>	<b>Possible reasons</b>
... 10 001	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 1	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 002	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 2	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 003	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 3	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 004	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 4	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 005	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 5	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 006	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 6	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 007	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 7	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 008	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 8	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 009	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 9	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 010	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 10	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 011	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 11	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 012	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 12	- BLD ANALOG-DIGITAL-CONVERTER error
... 10 013	<b>E</b>	GEO: BLD: AD-conversion error (raw data): AD-channel 13	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 001	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 1	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 002	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 2	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 003	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 3	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 004	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 4	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 005	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 5	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 006	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 6	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 007	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 7	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 008	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 8	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 009	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 9	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 010	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 10	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 011	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 11	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 012	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 12	- BLD ANALOG-DIGITAL-CONVERTER error
... 11 013	<b>E</b>	GEO: BLD: AD-actual value error (raw data): AD-channel 13	- BLD ANALOG-DIGITAL-CONVERTER error

<b>Error-ID</b> <b>033 .. ...</b>		<b>Description</b>	<b>Possible reasons</b>
... 20 001	<b>E</b>	GEO: BLD: invalid auto configuration	- BLD ADJUSTMENT configuration error
... 21 001	<b>E</b>	GEO: BLD: X-shutter: motor error	- BLD ADJUSTMENT error
... 21 002	<b>E</b>	GEO: BLD: X-shutter: poti error	- BLD ADJUSTMENT error
... 21 003	<b>E</b>	GEO: BLD: X-shutter: position timeout	- BLD ADJUSTMENT error
... 21 004	<b>E</b>	GEO: BLD: X-shutter: offset out of range	- BLD ADJUSTMENT error
... 21 005	<b>E</b>	GEO: BLD: X-shutter: shutters not detected	- BLD ADJUSTMENT error
... 22 001	<b>E</b>	GEO: BLD: Y-shutter: motor error	- BLD ADJUSTMENT error
... 22 002	<b>E</b>	GEO: BLD: Y-shutter: poti error	- BLD ADJUSTMENT error
... 22 003	<b>E</b>	GEO: BLD: Y-shutter: position timeout	- BLD ADJUSTMENT error
... 22 004	<b>E</b>	GEO: BLD: Y-shutter: offset out of range	- BLD ADJUSTMENT error
... 22 005	<b>E</b>	GEO: BLD: Y-shutter: shutters not detected	- BLD ADJUSTMENT error
... 23 001	<b>E</b>	GEO: BLD: IRIS-shutter: motor error	- BLD ADJUSTMENT error
... 23 002	<b>E</b>	GEO: BLD: IRIS-shutter: poti error	- BLD ADJUSTMENT error
... 23 003	<b>E</b>	GEO: BLD: IRIS-shutter: position timeout	- BLD ADJUSTMENT error
... 23 004	<b>E</b>	GEO: BLD: IRIS-shutter: offset out of range	- BLD ADJUSTMENT error
... 23 005	<b>E</b>	GEO: BLD: IRIS-shutter: shutters not detected	- BLD ADJUSTMENT error
... 24 001	<b>E</b>	GEO: BLD: filter: motor error	- BLD ADJUSTMENT error
... 24 002	<b>E</b>	GEO: BLD: filter: poti error	- BLD ADJUSTMENT error
... 24 003	<b>E</b>	GEO: BLD: filter: position timeout	- BLD ADJUSTMENT error
... 24 004	<b>E</b>	GEO: BLD: filter: offset out of range	- BLD ADJUSTMENT error
... 24 005	<b>E</b>	GEO: BLD: filter: shutters not detected	- BLD ADJUSTMENT error
... 99 001	<b>W</b>	GEO: BLD: unknown error <number> received	- Incompatible SW-Versions
... 30 001	<b>F</b>	GEO: BLD: HW: ROM test failed	- BLD-EPROM defect
... 30 002	<b>F</b>	GEO: BLD: HW: RAM test failed	- BLD-RAM defect
... 30 003	<b>F</b>	GEO: BLD: HW: HW Watchdog test failed	- BLD-WATCHDOG defect
... 30 004	<b>F</b>	GEO: BLD: HW: CAN test failed	- BLD-CAN-CHIP defect
... 30 005	<b>F</b>	GEO: BLD: HW: Power supply test failed	- BLD-POWER-SUPPLY not okay
... 30 006	<b>F</b>	GEO: BLD: HW: X_Light Power supply failed	- BLD X-LIGHT-POWER-SUPPLY not okay
... 30 007	<b>F</b>	GEO: BLD: HW: invalid Configuration	- BLD INVALID internal configuration
... 30 011	<b>F</b>	GEO: BLD: HW: HW-Watchdog time out	- BLD -SOFTWARE crash or Internal SW error caused HW - watchdog timeout
... 30 012	<b>F</b>	GEO: BLD: SW: unexpected NMI	- BLD unexpected interrupt occured caused by SW error or noise
... 30 013	<b>F</b>	GEO: BLD: SW: Class B interrupt	- BLD unexpected interrupt occured caused by SW error or noise
... 30 014	<b>F</b>	GEO: BLD: SW: unexpected other input	- BLD unexpected interrupt occured caused by SW error or noise
... 30 015	<b>F</b>	GEO: BLD: SW: SW_Watchdog time out	- BLD -SOFTWARE crash or Internal SW error caused SW - watchdog timeout
... 30 016	<b>F</b>	GEO: BLD: SW: stack underflow	- BLD-SOFTWARE crash or Internal SW error caused STACK underflow

<b>Error-ID 033 .. ...</b>		<b>Description</b>	<b>Possible reasons</b>
... 30 017	<b>F</b>	GEO: BLD: SW: stack overflow	- BLD-SOFTWARE crash or Internal SW error caused STACK overflow
... 30 021	<b>W</b>	GEO: BLD: SW: CAN: RX-overflow indication (CAN-chip)	- BLD receive overrun indication from CAN chip
... 30 022	<b>W</b>	GEO: BLD: SW: CAN: TX-overflow indication (CAN-chip)	- BLD transmit overrun indication from CAN chip
... 30 023	<b>W</b>	GEO: BLD: SW: CAN: RX queue overrun	- BLD SOFTWARE error caused by receive queue overrun
... 30 024	<b>W</b>	GEO: BLD: SW: CAN: TX queue overrun	- BLD SOFTWARE error caused by transmit queue overrun
... 30 025	<b>W</b>	GEO: BLD: SW: CAN: CAN error status bit set	- BLD CAN CHIP in error-state caused by communication error
... 30 026	<b>W</b>	GEO: BLD: SW: CAN: guarding failed	- BLD GUARDING failed, but is okay now again
... 30 031	<b>F</b>	GEO: BLD: HW: no hardware access	- BLD HARDWARE no access possible
... 30 032	<b>F</b>	GEO: BLD: HW: no encoder count	- BLD HARDWARE no signal from encoder
... 30 033	<b>F</b>	GEO: BLD: HW: no current	- BLD HARDWARE no current detected
... 30 034	<b>F</b>	GEO: BLD: HW: jammed, current too high	- BLD HARDWARE current too high detected
... 30 035	<b>F</b>	GEO: BLD: HW: calibration failed	- BLD HARDWARE calibration failed
... 30 036	<b>E</b>	GEO: BLD: HW: excessive position error	- BLD HARDWARE position errors detected
... 30 037	<b>F</b>	GEO: BLD: HW: mechanical range check failed	- BLD HARDWARE mechanical range check failed
... 30 038	<b>E</b>	GEO: BLD: HW: command not finished in time	- BLD HARDWARE command not finished
... 30 041	<b>F</b>	GEO: BLD: HW: calibration failed	- BLD CALIBRATION not successful
... 30 043	<b>F</b>	GEO: BLD: HW: temperatur sensor defect	- BLD HARDWARE temperatur sensor defect
... 30 044	<b>F</b>	GEO: BLD: HW: lamp, fan, or AEP defect	- BLD HARDWARE defect
... 99 001	<b>W</b>	GEO: BLD: unknown error <number> received	- Incompatible SW-Versions

#### 4.15. DC-CONTROL (Digital Camera - Control DCCO)

<b>Error-ID 040 .. ...</b>		<b>Description</b>	<b>Possible reasons</b>
... 01 001	<b>W</b>	DC: SYS: DB: Intern: DCCO invalid APR Receptor	Apr program has a wrong parameter
... 01 002	<b>W</b>	DC: SYS: DB: Intern: DCCO invalid APR Scan Direction	Apr program has a wrong parameter
... 01 003	<b>W</b>	DC: SYS: DB: Intern: DCCO invalid APR Frame Rate	Apr program has a wrong parameter
... 01 004	<b>W</b>	DC: SYS: DB: Intern: DCCO invalid AUX Receptor	Apr program has a wrong parameter
... 01 999	<b>W</b>	DC: SYS: SW: ltern: unknown error <number> occurred	internal Error - ; contact helpdesk Hamburg

#### 4.16. DC-CPX (Digital Camera - Central Part eXtended (Image detection) CPX)

Error-ID		Description	Possible reasons
<b>041 .. ...</b>			
... 00 000	<b>W</b>	DC: CPX: II: invalid command received	Internal SW error, contact helpdesk Hamburg
... 00 001	<b>W</b>	DC: CPX: II: invalid config received	Requested configuration not supported, contact helpdesk Hamburg
... 00 002	<b>W</b>	DC: CPX: II: invalid format request	Requested format not supported, contact helpdesk Hamb.
... 00 003	<b>W</b>	DC: CPX: II: ready timeout	II HW error
... 01 000	<b>W</b>	DC: CPX: VCR: invalid command received	Internal SW error, contact helpdesk Hamburg
... 02 000	<b>W</b>	DC: CPX: IRIS: invalid command received	Internal SW error, contact helpdesk Hamburg
... 02 001	<b>W</b>	DC: CPX: IRIS: invalid config received	Requested configuration not supported, contact helpdesk Hamburg
... 02 002	<b>W</b>	DC: CPX: IRIS: zero dose reference	wrong adjustment parameters
... 02 003	<b>W</b>	DC: CPX: IRIS: zero doserate reference	wrong adjustment parameters
... 02 004	<b>W</b>	DC: CPX: IRIS: ready timeout	HW error: Iris or filter
... 02 005	<b>F</b>	DC: CPX: IRIS: error iris sensor	XTV11 HW error iris
... 02 006	<b>F</b>	DC: CPX: IRIS: error filter sensor	XTV11 HW error filter
... 03 000	<b>W</b>	DC: CPX: CAM: unsupported feature	Requested function not supported
... 03 001	<b>W</b>	DC: CPX: CAM: invalid command received	Internal SW error, contact helpdesk Hamburg
... 03 002	<b>W</b>	DC: CPX: CAM: invalid config received	Requested configuration not supported, contact helpdesk Hamburg
... 03 003	<b>W</b>	DC: CPX: CAM: ready timeout	HW-error camera
... 04 000	<b>W</b>	DC: CPX: ROUTER: invalid command received	Internal SW error, contact helpdesk Hamburg
... 05 000	<b>W</b>	DC: CPX: SBUS: invalid start conditions	Signal Bus input or output defective, System hangs up
... 05 001	<b>W</b>	DC: CPX: SBUS: no camera sync	Video sync pulse not detected. CPX input/video cable/camera error
... 05 002	<b>W</b>	DC: CPX: SBUS: invalid command received	Internal SW error, contact helpdesk Hamburg
... 06 000	<b>W</b>	DC: CPX: ACQ: invalid command received	Internal SW error, contact helpdesk Hamburg
... 06 001	<b>W</b>	DC: CPX: ACQ: invalid buffer no. received	Requested buffer not supported, contact helpdesk Hamb.
... 07 000	<b>W</b>	DC: CPX: DOSE: invalid command received	Internal SW error, contact helpdesk Hamburg
... 07 001	<b>W</b>	DC: CPX: DOSE: invalid config received	Requested configuration not supported, contact helpdesk Hamburg
... 07 002	<b>W</b>	DC: CPX: DOSE: zero dose reference	wrong adjustment parameters
... 07 003	<b>W</b>	DC: CPX: DOSE: zero doserate reference	wrong adjustment parameters
... 08 000	<b>W</b>	DC: CPX: SERVICE: invalid command received	Internal SW error, contact helpdesk Hamburg
... 08 001	<b>F</b>	DC: CPX: SERVICE: default adjustment data used	CPX adjustment defaults due to inconsistency of previous adjustment data, execute adjustments
... 08 002	<b>F</b>	DC: CPX: SERVICE: download adjustment data rejected	version number of downloaded adjustment data doesn't fit to actual CPX software, execute adjustments

<b>Error-ID</b> <b>041 .. ...</b>		<b>Description</b>	<b>Possible reasons</b>
... 09 000	<b>F</b>	DC: CPX: HW: rom test failed	CPX CAN bus disturbed
... 09 001	<b>F</b>	DC: CPX: HW: ram test failed	CPX HW error
... 09 002	<b>F</b>	DC: CPX: HW: watchdog test failed	CPX HW error
... 09 003	<b>F</b>	DC: CPX: HW: can chip access failed	CPX HW error
... 09 004	<b>F</b>	DC: CPX: HW: nvram crc test failed	Battery low, CPX software updated, downloaded incompatible version of adjustment data
...			
... 10 000	<b>W</b>	DC: CPX: KERNEL: NMI detected	Internal error, contact helpdesk Hamburg
... 10 001	<b>W</b>	DC: CPX: KERNEL: stack underflow	Internal error, contact helpdesk Hamburg
... 10 002	<b>W</b>	DC: CPX: KERNEL: stack overflow	Internal error, contact helpdesk Hamburg
... 10 003	<b>W</b>	DC: CPX: KERNEL: class B int. detected	Internal error, contact helpdesk Hamburg
... 10 004	<b>W</b>	DC: CPX: KERNEL: eros166 wdog timeout detected	Internal error, contact helpdesk Hamburg
... 10 005	<b>W</b>	DC: CPX: KERNEL: c167 wdog timeout detected	Internal error, contact helpdesk Hamburg
... 10 006	<b>W</b>	DC: CPX: KERNEL: unknown interrupt detected	Internal error, contact helpdesk Hamburg
... 10 007	<b>W</b>	DC: CPX: KERNEL: invalid time	Internal error, contact helpdesk Hamburg
...			
... 11 000	<b>W</b>	DC: CPX: CAN: rx overrun	CPX CAN bus disturbed
... 11 001	<b>W</b>	DC: CPX: CAN: tx overrun	CPX CAN bus disturbed
... 11 002	<b>W</b>	DC: CPX: CAN: can overrun	CPX CAN bus disturbed
... 11 003	<b>W</b>	DC: CPX: CAN: bus off	CPX CAN bus disturbed
... 11 004	<b>W</b>	DC: CPX: CAN: estat set	CPX CAN bus disturbed
... 11 005	<b>W</b>	DC: CPX: CAN: disconnect	CPX CAN bus disturbed
... 11 006	<b>W</b>	DC: CPX: CAN: stopped	CPX CAN bus disturbed
... 11 007	<b>W</b>	DC: CPX: CAN: guard failed	CPX CAN bus disturbed
... 11 008	<b>W</b>	DC: CPX: CAN: guard again	CPX CAN bus disturbed
... 11 009	<b>W</b>	DC: CPX: CAN: cms init failed	CPX CAN bus disturbed
... 11 010	<b>W</b>	DC: CPX: CAN: create node failed	CPX CAN bus disturbed
... 11 011	<b>W</b>	DC: CPX: CAN: connect node failed	CPX CAN bus disturbed
... 11 012	<b>W</b>	DC: CPX: CAN: unknown error	Internal SW error, contact helpdesk Hamburg
...			
... 12 000	<b>W</b>	DC: CPX: internal software error	Internal SW error, contact helpdesk Hamburg
...			
... 99 000	<b>W</b>	DC: CPX: unknown error .... received	Incompatible SW-Versions

#### 4.17. DC-IP (Digital Camera - Image Processing (LIM, DIM) DIM)

Error-ID 042 .. ...		Description	Possible reasons
... 00 001	<b>F</b>	DC: DIM: back-up ram error	- DIM HARDWARE error backup-ram defect
... 00 002	<b>F</b>	DC: DIM: graphic ram error	- DIM HARDWARE error graphic-ram defect
... 00 003	<b>F</b>	DC: DIM: image memory error	- DIM HARDWARE error image memory defect
... 00 004	<b>F</b>	DC: DIM: noise reduction LUT error	- DIM HARDWARE error, noise reduction not okay
... 00 005	<b>F</b>	DC: DIM: automatic windowing LUT error	- DIM HARDWARE error, automatic windowing not okay
... 00 006	<b>F</b>	DC: DIM: disk I/F buffer error	- DIM HARDWARE disk buffer error
... 00 007	<b>F</b>	DC: DIM: dual port ram error	- DIM HARDWARE dual port ram error
... 01 001	<b>F</b>	DC: DIM: hard disk initializing error	- DIM HARDWARE disk error
... 01 002	<b>F</b>	DC: DIM: disk read out error	- DIM HARDWARE disk error
... 01 003	<b>F</b>	DC: DIM: disk write error	- DIM HARDWARE disk error
... 01 004	<b>F</b>	DC: DIM: disk read out error for text data area	- DIM HARDWARE disk error
... 01 005	<b>F</b>	DC: DIM: disk write error for text data area	- DIM HARDWARE disk error
... 01 006	<b>F</b>	DC: DIM: disk read out error for image data area	- DIM HARDWARE disk error
... 01 007	<b>F</b>	DC: DIM: disk write error for image data area	- DIM HARDWARE disk error
... 01 008	<b>W</b>	DC: DIM: CAN rx-queue overrun	- DIM COMMUNICATION error caused by receive queue overrun
... 01 009	<b>W</b>	DC: DIM: CAN chip overrun	- DIM COMMUNICATION error caused by chip overrun
... 99 000	<b>W</b>	DC: DIM: unknown error ..... received	- Incompatible SW-Versions

### 4.18. XG-CONTROL (X-ray Generator Control XGCO)

Error-ID 060 .. ...		Description	Possible reasons
... 00 100	E	XG:SYS:SW: Invalid APR (<APR numberr> tomo angle: <value>	APR database configuration error
... 00 101	E	XG:SYS:SW: Invalid APR (<APR number>) tube:<value>	APR database configuration error
... 00 102	E	XG:SYS:SW: Invalid APR (<APR number>) fluoroscopy focus: <value>	APR database configuration error
... 00 103	E	XG:SYS:SW: Invalid APR (<APR number>) fluoroscopy curve	APR database configuration error
... 00 104	E	XG:SYS:SW: Invalid APR (<APR number>) fluoroscopy start kV: <value>	APR database configuration error
... 00 105	E	XG:SYS:SW: Invalid APR (<APR number>) fluoroscopy start mA: <value>	APR database configuration error
... 00 106	E	XG:SYS:SW: Invalid APR (<APR number>) fluoroscopy start ms: <value>	APR database configuration error
... 00 107	E	XG:SYS:SW: Invalid APR (<APR number>) dose input: <value>	APR database configuration error
... 00 108	E	XG:SYS:SW: Invalid APR (<APR number>) exposure focus: <value>	APR database configuration error
... 00 109	E	XG:SYS:SW: Invalid APR (<APR number>) exposure measuring fields: <value>	APR database configuration error
... 00 110	E	XG:SYS:SW: Invalid APR (<APR number>) automatic exposure technique: <value>	APR database configuration error
... 00 111	E	XG:SYS:SW: Invalid APR (<APR number>) manual exposure technique: <value>	APR database configuration error
... 00 112	E	XG:SYS:SW: Invalid APR (<APR number>) exposure kV: <value>	APR database configuration error
... 00 113	E	XG:SYS:SW: Invalid APR (<APR number>) exposure mA: <value>	APR database configuration error
... 00 114	E	XG:SYS:SW: Invalid APR (<APR number>) exposure ms: <value>	APR database configuration error
... 00 115	E	XG:SYS:SW: Invalid APR (<APR number>) exposure mAs: <value>	APR database configuration error
... 00 116	E	XG:SYS:SW: Invalid APR (<APR number>) film screen combination: <value>	APR database configuration error
... 00 117	E	XG:SYS:SW: Invalid APR (<APR number>) density correction: <value>	APR database configuration error
... 00 118	E	XG:SYS:SW: Invalid APR (<APR number>) power factor: <value>	APR database configuration error
... 00 119	E	XG:SYS:SW: Invalid APR (<APR number>) exposure curve	APR database configuration error
... 00 120	E	XG:SYS:SW: Invalid APR (<APR number>) tomo time: <value>	APR database configuration error
... 00 199	E	XG:SYS:SW: unknown data error %d for APR <APR number> received	Internal SW error; contact helpdesk Hamburg
... 00 200	E	XG:SYS:SW: System/Generator film-screen combinations do not match	The number of film/screen combinations that are used in the APR database is higher than the programmed film/screen combinations at the generator.
... 00 201	E	XG:SYS:SW: Invalid tomo angle selection	contact helpdesk Hamburg
... 00 999	W	XG: SYS:SW: unknown error received	contact helpdesk Hamburg

#### 4.19. XG-SUBSYS (X-ray Generator Subsystem)

Error-ID	Description	Possible reasons
<b>061 .. ...</b> ... xx xxx where xx xxx is a error num- ber defined by the generator	XGEN:SW: <any string sent by the generator>	see generator error descriptions

#### 5. Definition of logging information (minimal messages)

No.	Logging text	Description
1	System ON, SW Release <xx.xx.xx> / <xx.xx.xx>, System last OFF: <date time>	System was switched on
2	X-SCOPE terminal connected	Service tool is connected
3	X-SCOPE connection terminated	Service tool is disconnected
4	Error level: < level >	Error level is changed by Service

#### 6. Definition of service logging messages

The service log messages may be parametrized. Such parameters are noted in angle brackets and described in the right column.

##### 6.1. SYCO (System Control)

Service Logging text	Description
in preparation	in preparation

## 6.2. UICO (User Interface Control)

Service Logging text	Description
CUI start indication received	The cockpit user interface has started
CUI termination indication received	The cockpit user interface has terminated
CUI conflicting requests for changing <X-Ray param>	The user simultaneously tries to step up and down one of the X-Ray parameter. <X-Ray param>: kv, mA, ms, mAs or density at the CUI
CUI start changing <X-Ray param> upwards	The user starts to step up one of the X-Ray parameter. <X-Ray param>: kv, mA, ms, mAs or density at the CUI
CUI start changing <X-Ray param> downwards	The user starts to step down one of the X-Ray parameter. <X-Ray param>: kv, mA, ms, mAs or density at the CUI
CUI changing <X-Ray param> stopped	The user stops to step one of the X-Ray parameter. <X-Ray param>: kv, mA, ms, mAs or density at the CUI
CUI select density correction <value>	The user selects the density correction at the CUI
CUI select <size> focus	The user selects a focus at the CUI. <size>: small, medium or large
CUI select vario focus <value>%	The user selects a vario focus at the CUI. 1 <= <value> <=100
CUI select AEC <state>	The user selects AEC at the CUI. <state>: on or off
CUI select <which> dose measuring field[s]	The user selects one of the following dose measurement fields at the CUI: <which> : no, left, middle, right, left and right, left and middle, middle and right, all.
CUI select film screen combination <value>	The user selects a film screen combination at the CUI. 1 <= <value> <= 5
CUI reset fluoroscopy buzzer	The user resets the fluoroscopy buzzer at the CUI
CUI select auxiliary <type>	The user selects an auxiliary at the CUI. <type>: camera, cassette, table bucky, wall bucky, free cassette, other
CUI select APR <value>	The user selects an APR at the CUI.
CUI modify APR <value> (mapped to select APR)	The user modifies an APR at the CUI. This request is mapped to the APR selection for the first releases.
CUI select tomo angle <value>	The user selects a tomo angle at the CUI
CUI close post exposure display	The CUI sends a request to close the post exposure display
CUI select automatic technique <type>	The user selects an automatic technique at the CUI. <type>: kV only, kV-mA, kV-ms
CUI select manual technique <type>	The user selects a manual technique at the CUI. <type>: kV-mA-ms, kV-mAs, kV-mAs-ms
Beam long joystick inverted due to movement orientation	The movement direction for the beam longitudinal movement is inverted
Tabletop lateral movement inverted due to movement orientation	The movement direction for the tabletop lateral movement is inverted
<Movement> request ignored due to <reason>	A movement request is ignored due to a specific reason. <Movement> : tilt table, tabletop lateral, beam longitudinal, compressor, angulate beam. <reason>: beam decoupled, cassette in load position, movement key pressed during startup, undefined
<Movement> request stopped due to <reason>	A movements is stopped due to a specific reason. <Movement>, <reason>: see above.
Conflicting requests for movement <Movement>	There are conflicting request for one of the above movements from different user interfaces (e.g. tilt table headwards at TSO and footwards at GOC).

Service Logging text	Description
Key <number> up at <User Interface>, function: <function>	<p>A key is pressed at a user interface.</p> <p>&lt;number&gt;: number of key at the user interface.</p> <p>&lt;User Interface&gt;: TSO, GOC, THG or Cockpit</p> <p>&lt;function&gt; specifies the system function that is bound to the key.</p> <p>&lt;function&gt; is logged as text string.</p> <p>Attention: The Key number is not logged for Cockpit.</p>
Key <number> down at <User Interface>, function: <function>	<p>A key is released at a user interface.</p> <p>&lt;number&gt;: number of key at the user interface.</p> <p>&lt;User Interface&gt;: TSO, GOC, THG or Cockpit</p> <p>&lt;function&gt; specifies the system function that is bound to the key.</p> <p>&lt;function&gt; is logged as text string.</p> <p>Attention: The Key number is not logged for Cockpit</p>
Joystick <number> <position> at <User Interface>, function: <function>	<p>A joystick is operated at a user interface.</p> <p>&lt;number&gt;: number of joystick at the user interface.</p> <p>&lt;position&gt;: positive increments, negative increments or zero position.</p> <p>&lt;User Interface&gt;: TSO, GOC, THG or Cockpit</p> <p>&lt;function&gt; specifies the system function that is bound to the key.</p> <p>&lt;function&gt; is logged as text string.</p> <p>Increments are logged only once per operation. That is, only the first increment for a direction is logged. The next log entry for the joystick will be the zero position if the joystick is released.</p>
Indicator <number> <status> at <User Interface>, function: <function>	<p>An indicator (LED or buzzer) has changed its state at a user interface.</p> <p>&lt;number&gt;: number of indicator at the user interface.</p> <p>&lt;status&gt;: off, on, flash or blink., where blink is a single indicator on/off transition and flash is a continuous on/off transition.</p> <p>&lt;User Interface&gt;: TSO, GOC, THG or Cockpit</p> <p>&lt;function&gt; specifies the system function that is bound to the indicator.</p>

### 6.3. GEST (Geometry Stand Control)

Service Logging text	Description
Tube < brake > brake command sent to GCU: < cmd > brake!	A tube brake command is sent to the GCU. <brake> specifies which tube brake is meant ('vertical' or 'long.'). <cmd> can be 'Lock' or 'Release'.
Tube < brake > brake state received from GCU: <state>	The actual brake states are received. <brake> specifies which tube brake is meant ('vertical' or 'long.'). <state> can be 'Locked', 'Released' or 'undefined'.
<class>: event received from GCU: <event>	An event is received from the GCU. <class> specifies the event class / type. <event> indicates the no.
Error received from GCU. Error message see below	An error is received from the GCU. It is not further specified, as the error is indicated anyways by an Error Log Message
Configuration data downloaded to GCU	Configuration data is downloaded to the GCU.
Download of GCU config data failed	Download of configuration data to the GCU failed.
<axis>: move command ignored during Tomography	As a Tomography or a Tomo test is running, other movement requests are ignored.
<axis>: move command ignored, Compressor is active	As the Compressor is in action, move requests for the table lateral and beam long. axes are ignored.
Table tilt: move command ignored, Bucky frame is moving	As Bucky frame is moving, move requests for the tilt axis are ignored. Both axes cannot run the same time.
Table tilt: move command ignored during Spotfilm exposure	As a Spotfilm exposure is running, move requests for the tilt axis are ignored.
Beam long.: move command ignored, Beam angulating	As the Beam is angulating, move requests for the Beam long. axis are ignored. Both axes cannot run the same time.
Beam angulation: move command ignored, Beam long. moving	As Beam long. is moving, angulate Beam requests are ignored. Both axes cannot run the same time.
Beam angulation: move command ignored, Fulcrum moving	As Fulcrum is moving, angulate Beam requests are ignored. Both axes cannot run the same time.
Beam angulation: delayed, move Fulcrum down first	Fulcrum first has to move to bottom position before the beam can start angulating. When Fulcrum has reached the bottom position and an angulate beam request is still present, beam starts angulating.
Beam angulation: move command ignored, only possible to 0	If Tomo is selected or if Fulcrum is not in bottom position, beam has to move to / stay in 0°.
Bucky frame: move command ignored during Preparation	During exposure preparation (also during exposure) bucky frame move commands are ignored.
Bucky frame: move command ignored during Fluoroscopy	During fluoroscopy bucky frame move commands are ignored.
Bucky frame: move command ignored, table is tilting	As the table is tilting, bucky frame move requests are ignored. Both axes cannot run the same time.
Bucky frame: move command ignored, cassette tray is out	The cassette tray has to be inside the table before the bucky frame can start moving.
Bucky frame: move command ignored: Receptor Table Bucky	If receptor Table Bucky is selected, and the bucky frame is in Exposure position, it has to stay there and any bucky frame move request is ignored.
Bucky frame: move command ignored (fulcrum up). Angulate to 0 !	If a Tomography just went wrong (beam angle is not 0 AND the fulcrum position is not in its bottom position), a Bucky frame move command must be ignored. Otherwise the Bucky frame could be damaged.
Fulcrum: move command ignored, beam is angulated	The beam has to be angulated to 0° before the Fulcrum can start moving.
Fulcrum: move command ignored, move up only	If fulcrum position is 0 or lower, it is not allowed to move down anymore!

Service Logging text	Description
<axis>: move cmd sent to GCU, speed= xxx, Force=Fxx <axis>: move behaviour: <behaviour>	A compressor move command has just been sent out to the GCU. <axis>: 'Compressor'.
<axis>: move cmd sent to GCU, speed= xxx, position: xxx <axis>: move behaviour: <behaviour>	A move command for the specified axis has just been sent out to the GCU.
<axis>: move cmd ignored, GCU not connected !	Movement exception handling: As the GCU is not connected to the System Controller, move commands cannot be performed at the moment. A User Guidance is displayed.
<axis>: move cmd ignored, Collision !	Movement exception handling: As a Collision isn't resolved, move commands cannot be performed at the moment. A User Guidance is displayed.
<axis>: move cmd ignored, Emergency Stop !	Movement exception handling: As one of the two Emergency Stop buttons is pressed, move commands cannot be performed at the moment. A User Guidance is displayed.
Column decouple command sent to GCU	A command has just been sent out to the GCU to decouple table from column.
Bucky frame position received from GCU: <pos.>	The actual value <pos.> for BUCKY FRAME position has just been delivered by the GCU.
Couple state received from GCU: <sts>	The actual value <sts> for COUPLE STATE has just been delivered by the GCU.
Cassette tray position received from GCU: <pos.>	The actual value <pos.> for CASSETTE TRAY position has just been delivered by the GCU.
Tomography condition received from GCU: <cond.>	The actual value <cond.> for TOMO condition has just been delivered by the GCU.
Door contact state received from GCU: <sts>	The actual value <sts> for DOOR contact state has just been delivered by the GCU.
SRP switch state received from GCU: <sts>	The actual value <sts> for SRP switch state has just been delivered by the GCU.
Compressor force state received from GCU: <sts>	The actual value <sts> for COMPRESSOR force state has just been delivered by the GCU.
<axis>: stops, as Compressor is active	As the Compressor is in action, active table lateral and beam long movements are stopped.
Tomography: state = IDLE, request <rq> ignored	TOMO state machine: During this state (IDLE means no activity) the latest user request has no effect
Tomography: PRESET RUNNING, request <rq> ignored	TOMO state machine: During this state (PRESET RUNNING) the latest user request has no effect
Tomography: READY FOR PREPARE, request <rq> ignored	TOMO state machine: During this state (READY FOR PREPARE) the latest user request has no effect
Tomography: TEST RUNNING, request <rq> ignored	TOMO state machine: During this state (TEST RUNNING) the latest user request has no effect
Tomography: PREPARE RUNNING, request <rq> ignored	TOMO state machine: During this state (PREPARE RUNNING) the latest user request has no effect
Tomography: READY FOR TOMO RUN, request <rq> ignored	TOMO state machine: During this state (READY FOR TOMO RUN) the latest user request has no effect
Tomography: TOMO RUNNING, request <rq> ignored	TOMO state machine: During this state (TOMO RUNNING) the latest user request has no effect
Tomography command ignored, GCU is not connected !	TOMO exception handling: As the GCU is not connected to the System Controller, TOMO commands cannot be performed at the moment. A User Guidance is displayed.
Tomography command ignored, Collision !	TOMO exception handling: As a Collision isn't resolved, TOMO commands cannot be performed at the moment. A User Guidance is displayed.
Tomography command ignored, Emergency Stop !	TOMO exception handling: As one of the two Emergency Stop buttons is pressed, TOMO commands cannot be performed at the moment. A User Guidance is displayed.

Service Logging text	Description
Tomography parameters sent to GCU (angle: xxx degree, time: xxx ms)	A message has just been sent out to the GCU to deliver new values for TOMO angle and TOMO exposure time.
Tomography parameters undefined (angle: xxx degree, time: xxx ms)	As the TOMO parameters are not yet initialized by APR, they cannot be sent to the GCU.
Synchronize request (<rq>) sent to GCU	A message has just been sent out to the GCU to start or stop the exposure synchronization by the GCU.

#### 6.4. GECM (Geometry Collimation Control)

Service Logging text	Description
BLU RX: x=... y=...	collimation values received from beam limiting device
BLU RX: event=....	event received from beam limiting device
BLU RX: error no=... id=....	error-number and error-id received from beam limiting device
GCU RX: cass-format=...	cassette-format received from gcu
BLU TX: x=... y=...	collimation values transferred to beam limiting device
BLU TX: move manual sh-id=... speed=....	manual collimation command transferred to beam limiting device with parameter shutter and speed
BLU TX: sid=....	normed SID value transferred to beam limiting device during startup or reconnect
BLU TX: set manual limit x=... y=...	limits for manual movements transferred to beam limiting device
BLU TX: light=...	light command transferred to beam limiting device
<b>Additions for Serial Changer implementation:</b>	
Configuration data uploaded from SEC	Configuration domain upload (during startup) was successful
Upload of SEC configuration data failed	Configuration domain upload (during startup) was not successful
Unknown mechanical SEC version uploaded from SEC	SYSCO cannot identify the uploaded SEC version
Configuration data downloaded to SEC	Configuration domain download was successful (functionality not in use so far)
Download of SEC configuration data failed	Configuration domain download was not successful (functionality not in use so far)
Cassette tray: move command ignored during Exposure	Command execution restricted for given reasons
Cassette tray: move command ignored during Bucky Frame movement	Command execution restricted for given reasons
Set division restricted during Expo or manual Collimation	Command execution restricted for given reasons
Set division restricted, cassette is in use	Command execution restricted for given reasons
<axis>: SEC event: <event>	Movement related event received
SEC Event: <event>	Other event received
Unknown event <event id> <event param.> received from SEC	SYSCO cannot identify the SEC event
cassette format received from SEC: <format id>	Incoming actual value
Collimation position received from SEC: <x-pos.> <y-pos.>	Incoming actual value
grid state received from SEC: <status id>	Incoming actual value
cassette state received from SEC: <status id>	Incoming actual value
Collimator state received from SEC: <status id>	Incoming actual value
Error received from Serial Changer (class=<class> error=<id>)	Incoming actual value

Cassette tray position command <cmd> sent to SEC	Outgoing command
Cass. coll. position command x=<x-pos> y=<y-pos.> sent to SEC	Outgoing command
cassette position command x=<x-pos> y=<y-pos.> sent to SEC	Outgoing command
Prepare Grid command <cmd> sent to SEC	Outgoing command

## 6.5. IDCO (Image Detection Control)

Service Logging text	Description
CPX RX single/series: buffer=... data=...	received single series indication from CPX
CPX RX frame-rate: buffer=...data=...	frame rate indication received from CPX expo : buffer=2 fluo : buffer= 1 independent from fluo and expo : buffer = 0
CPX RX measure field: buffer=... data=...	measuring field indication received from CPX
CPX RX ii-field-size: buffer=... data=...	ii-field-size indication received from CPX
CPX RX image-scan-direction: buffer=... data=...	image scan direction indication received from CPX
CPX RX expo-dose: buffer=...data=...	expo dose indication received from CPX
CPX RX fluo-dose: buffer=...data=...	fluo dose indication received from CPX
CPX RX expo-time: buffer=... data=...	expo time indication received from CPX
CPX RX lock-setting-confirm: data=...	lock setting confirmation from CPX
CPX RX acqui-mode-status: buffer=... data=...	acquisition mode status indication from CPX
CPX RX error: no.=... id.=...	error number and id from CPX
CPX TX acquis-task-id: buffer=... data=...	transferred acquisition task id with data not involved, involved or sync master to CPX.
CPX TX single-series: buffer=... data=...	transferred single series request to CPX
CPX TX frame-rate: buffer=... data=...	transferred frame rate to CPX
CPX TX measure-field: buffer=... data=...	transferred doserate measuring field selection to CPX
CPX TX ii-field-size: buffer=...data=...	transferred ii-field-size selection small medium large to CPX
CPX TX image-scan-dir: buffer=...data=...	transferred camera scan direction normal or reverse to CPX
CPX TX dose-level: buffer=... data=...	transferred dose level to CPX
CPX TX expo-time: buffer=... data=...	transferred expo-time to CPX
CPX TX cmd-lckn : data=...	transferred fluoroscopy control lock in to CPX

**6.6. IPCO (Image Processing Control)**

Service Logging text	Description
DIM RX single-series: buffer=... data=...	single series indication received from DIM expo : buffer=2 fluo : buffer= 1 independent from fluo and expo : buffer = 0
DIM RX acqui-mode-status: buffer=...data=...	acquisition mode status indication from DIM
DIM RX error: no=... id=...	error number and id from DIM
DIM TX acquis-task-id: buffer=... data=...	transferred acquisition task id with data involved or not involved to DIM.
DIM TX storage-mode: buffer=... data=...	storage mode transferred to DIM
DIM TX single-series: buffer=... data=...	single series request transferred to DIM
DIM TX frame-rate: buffer=... data=...	frame rate transferred to DIM
DIM TX elec-shutter: left=... right=... type=...	electronic shutter values left/right transferred to DIM
DIM TX elec-shutter: upper=... lower=... type=...	electronic shutter values upper/lower transferred to DIM
DIM TX grab-fluo-frame: sts=...	grab request transferred to DIM