

## Technical Note: CCU error codes

This technical note describes and explains error codes which can show up in OmniPro-Accept and be displayed on the remote control screen, which could be related to the CCU control unit.

### NOTICE

#### IMPORTANT NOTICE

##### RE-OCCURRENCE OF WARNINGS AND ERRORS

In the case that an error or warning message appears continuously or frequently during measurements, it is recommended that you protocol the Error ID's and circumstances which could have caused the event (e.g. measurement / equipment setup) and to contact the local IBA Dosimetry representative.

The severity of an event can range from negligible (if the meaning of an error code is just an advice to restart or review the equipment, settings or measurements) to serious (in the case that the error code indicates a defect in the hardware and that the root cause could be a handicap in continuing measurement tasks). In some cases a combination or sequence of events could appear, whereby the second and following error or warning could be an after-effect of the first one (for instance, Error ID 7002 is usually a result of Error ID 7001, i.e. if the servo motors are switched off; the velocity of the servo movement is no longer given, of course).

By the nature of the underlying root cause behind an event, it should be determined whether or not the error has been produced by a hardware defect or by wrong handling.

Example Error ID 300A: "The TMR position is not updated" could mean that there is a defect in the hardware, a loose cable connection, the float is hanging somewhere in the pipe, or the water level is out of the measurement range of the probe and therefore the software does not recognize a changing water level.

In this case, the operator should verify the water level, equipment setup and device conditions (TMR connection and functionality of the probe).

### CAUTION

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##### RESTARTING CCU

In case of restarting / rebooting the CCU, all stored and defined positions and settings are lost and need to be re-defined. Consequently, also the CCU Control Panel of the OmniPro-Accept software should be closed and re-opened after re-powering the CCU to reset all parameters.

## 1 System errors:

System errors / warnings are associated with an event in the CCU, the hand pendant, the phantom, or the measurement and setup itself.

They can be caused by a defective hardware component of the control unit, a defect in the connected hardware (like cables, detectors) or by the environmental and setup conditions (e.g. if the controller is placed too close to the primary beam).

Error ID	Interpretation	Comment	
1	System Initialization error in the internal memory test	An event occurred in the CCU, please restart CCU.	
2	System Initialization error in the external flash test		
3	System Initialization error in the basic communication interface (ETHERNET)	Please check the Ethernet connection and cables and restart CCU.	
4	System Initialization error in the I2C Bus or peripherals (EEPROM)	An event occurred in the CCU, please restart CCU.	
5	System Initialization error in the program FLASH memory		
6	System Initialization error in the parameter EEPROM module memory		
7	System Initialization error in the parameter EEPROM base board memory		
8	System Initialization error in the parameter EEPROM electrometer 1 memory		
9	System Initialization error in the Ethernet protocol unit		
A	System Initialization error in the data acquisition system		An event occurred in the CCU, please restart CCU.
B	System Initialization error in the DAC system		
C	System Initialization error in the ADC system		
D	System Initialization error in the XPLD IC		
E	System Initialization error in the VOLTAGES		
F	System Initialization error in the I_BUTTON	Please check drive control connection cable and restart CCU.	

Error ID	Interpretation	Comment	
10	System Initialization error in the internal temperature sensor	An event occurred in the CCU, please restart CCU.	
11	System Initialization error in the CAN bus		
12	System Initialization error in the remote control firmware update		
13	System Initialization error in the DSPI Bus or peripherals	An event occurred in the CCU, please restart CCU.	
14	System Initialization error in the parameter EEPROM electrometer 2 memory		
10001	System Run error: I2C bus components or bus		
10002	System Run error: DAC system		
10003	System Run error: ADC system		
10004	System Run error: ETHERNET interface		An event occurred in the CCU, please restart computer and CCU. Verify TCP/IP settings and Ethernet connection.
10005	System Run error: Communication protocol		Please check the Ethernet connection and cables and restart CCU and computer.
10006	System Run error: Data acquisition device parameter error	An event occurred in the CCU and could influence the measurement results. Please repeat measurement if necessary and check the equipment and the measurement setup.	
10007	System Run error: Data acquisition device running error		
10008	System Run error: Voltage system		
10009	System Run error: XPLD system	An event occurred in the CCU, please restart CCU.	
1000A	System Run error: Flash system		
1000B	System Run error: Internal temperature system		
1000C	System Run error: CAN system		
1000D	System Run error: DSPI system	An event occurred in the CCU, please restart CCU.	
1000E	System Run error: Scatter radiation diod system	The CCU recognizes high radiation. Please check installation location of CCU and reposition the controller.	
1000F	System Run error: Trajectory system	An event occurred in the CCU and could influence the measurement results. Please repeat measurement if necessary and check the equipment and the measurement setup.	
10010	System Run error: The Position is not defined	Position is not defined.	

## 2 Voltage errors:

Voltage errors and warnings are related to a malfunction of electronic components in the CCU, the phantom electronics (e.g. motors), the equipment setup or with connected hardware (e.g. cabling).

Error ID	Interpretation	Comment
20001	Potentiometer reference range voltage error	An event occurred in the CCU, please restart CCU.
20002	Temperature range error	
20003	Pressure range error	
20004	Pressure reference voltage error	
20005	Ground base board range voltage error	
20006	Reference range voltage error	
20007	Monitor Bias 1 range voltage error	
20008	Monitor Bias 2 range voltage error	
20009	Pressure reference range voltage error	
2000A	Unknown target voltage error	
2000B	Potentiometer tolerance voltage error	An event occurred in the CCU and could influence the measurement results. Please repeat measurement if necessary and check the equipment and the measurement setup.
2000C	Scattered radiation tolerance voltage error	The CCU recognizes high radiation. Please check installation location of CCU.

Error ID	Interpretation	Comment
2000D	Bias 1 tolerance voltage error	An event occurred in the CCU which could influence the measurement results. Please repeat measurement if necessary and check the equipment and the measurement setup.
2000E	Bias 2 tolerance voltage error	
2000F	Pressure reference tolerance voltage error	
20010	Ground base board tolerance voltage error	
20011	Reference tolerance voltage error	
20012	Remote control tolerance voltage error	
20013	Motor 18 volts tolerance voltage error	
20014	Motor plus tolerance voltage error	
20015	5 volts tolerance voltage error	
20016	2,5 volts tolerance voltage error	
20017	Motor minus tolerance voltage error	
20018	Ground module tolerance voltage error	

### 3 Scanning errors:

Scanning errors or warnings could occur if, during measurements or the electrometer setup, an event will be recognized which could have an influence on the measurement itself or cause a malfunction during the scanning.

Normally, these incidents can be eliminated when the measurement setup is reviewed and modified.

#### CAUTION

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#### CCU OVERFLOW IN ABSOLUTE DOSE MEASUREMENT

Should an overflow error occur during absolute dose measurement with the CCU, the scan is stopped and will be restarted.

Thus, it is recommended to perform some pre-scans to determine the correct (appropriate) sensitivity range for the upcoming measurements before starting the relative and absolute dose measurements:

- Select desired energy.
- Position the sensor in energy-max-depth.
- LINAC: Set highest expected Dose-Rate (MU's).
- Profile/Curve measurements.
- Compare the selected sensitivity range and signal-value.

After these steps, the observed signal overflows should not appear anymore. The electrometer signal level displayed in the CCU Control Panel bars should not be in the upper range area of the selected sensitivity range. This procedure should be repeated every time the energy or other influential parameters will be changed.

Error ID	Interpretation	Comment
30001	Electrometer 1 overflow error	Selected sensitivity is not appropriate. Please repeat measurement if necessary.
30002	Electrometer 1 high overflow error	
30003	Electrometer 1 underflow error	No radiation signal detected, please check setup.
30004	Electrometer 2 overflow error	Selected sensitivity is not appropriate. Please repeat measurement if necessary.
30005	Electrometer 2 high overflow error	
30006	Electrometer 2 underflow error	No radiation signal detected, please check setup.
30007	Data memory allocation error	An event occurred in the CCU which could influence the measurement results.
30008	Data memory overflow error	Please repeat measurement if necessary and check the equipment and the measurement setup.
30009	Scan parameters out of range	

Error ID	Interpretation	Comment
3000A	A scan measurement is already running	A scan measurement is already running.
3000B	The TMR position is not updated	An event occurred at the TMR probe. Please check TMR connection and functionality.
3000C	Water level reached the upper limit position	Water level has reached the upper limit position
3000D	The position it is not defined	Position is not defined.

## 4 CAN-bus errors:

A CAN-bus error belongs to a malfunction between the CCU and the hand pendant. The root cause is hardware related and could be located either in the control unit or hand controller.

Error ID	Interpretation	Comment
40001	Error on the Mailbox initialization transmission task	An event occurred in the CCU, please restart CCU.
40002	Error on the Mailbox activation transmission task	
40003	Error on the Mailbox initialization reception task	
40004	Error on the Mailbox activation reception task	
40005	Error on the CAN initialization	
40006	Error on the CAN start	
40007	Error on the CAN selection mode	
40008	Error on the CAN interrupts installation	
40009	Error on transmitting CAN messages	Please check hand pendant connection and restart CCU.
4000A	Error on receiving CAN messages	

## 5 Ethernet errors:

Ethernet errors and warnings are mostly caused by an improper Ethernet connection between the CCU and computer. It is recommended to review the TCP/IP settings as well the Ethernet connection itself (sockets, cabling etc).

To determine whether the local network could be the root cause (in case of re-occurrence of Ethernet errors); a direct connection between computer and the CCU should be established and tested first.

Error ID	Interpretation	Comment
50001	RTCS initialization error	An event occurred in the CCU, please restart computer and CCU. Verify TCP/IP settings and Ethernet connection. Review firewall settings and availability of Ethernet port (or network hub).
50002	Driver initialization error	
50003	Interfaces initialization error	
50004	Bind initialization error	
50005	Datagram socket initialization error	
50006	Datagram bind socket initialization error	
50007	Stream socket initialization error	
50008	Stream bind socket initialization error	
50009	Listen initialization error	
5000A	Connection initialization error	
5000B	Gateway initialization error	
5000C	Plug and play message error	
5000D	Receiving message error	
5000E	Sending message error	
5000F	Wrong message error	

## 6 XPLD errors:

XPLD errors are caused by an incident at the CCU output ports.

Error ID	Interpretation	Comment
60001	Xpld programming error	An event occurred at the CCU, please restart CCU.
60002	Xpld verification error	

## 7 Control loop errors:

This error belongs to a malfunction in the control loop between the phantom and the CCU, i.e. the controller detected an event during supervising the phantom servo motion.

Error ID	Interpretation	Comment
70001	All the motor outputs are switch off due to an error	An event occurred in the CCU and could influence the measurement results.
70002	The velocity is being adapted due to a malfunction (warning)	Please repeat measurement if necessary and check the equipment and the measurement setup.

## 8 Flash errors:

Flash errors are related to the cache memory of the CCU.

Error ID	Interpretation	Comment
80001	Erasing flash error	An event occurred in the CCU, please restart CCU.
80002	Writing flash error	