"X-RAY EXPOSURE INHIBITED: INTERLOCK ERROR"

APPLICABLE TO: Precision system and Intuition 4C system

ERROR MESSAGES: Bucky 1 error

Bucky 2 error

Interlock 1 error

INFORMATION: This instruction covers how to find the root cause for inhibited x-ray exposures and correct it.

HOW THE AFFECTED FUNCTIONALITY IN THE SYSTEM _SHOULD_ WORK:

When an examination protocol is selected in Canon NE a detector is selected (an output from the generator is initiated) and when the detector is ready it shows in the software (as an input to the generator is initiated). When pressing the prep/exposure button, x-ray is performed and the detector reads an image that's presented in the Canon NE software.

SYMPTOMS OF THIS ERROR:

It is not possible to perform x-ray when pressing prep/exposure button.

There is an error message appearing in Canon NE saying:
Bucky 1-, _Bucky 2-_ or _Interlock 1_-error.

POSSIBLE CAUSES:

- Incorrect protocol settings
- Incorrect generator software settings
- Incorrect electrical connections at generator
- Problem with Canon I/F box

ACTION STEPS:

Begin at step 1 and follow through on all steps laid out on next pages.

STEP 1 -- Check settings in Canon NE protocols

You can do this by using the protocol editor or looking into the CPI overwrap logfile.

If you are on site, easiest way is to check the protocol editor for *the specific protocol* that encounters the issues.

Check that the you are using correct Receptor setting:
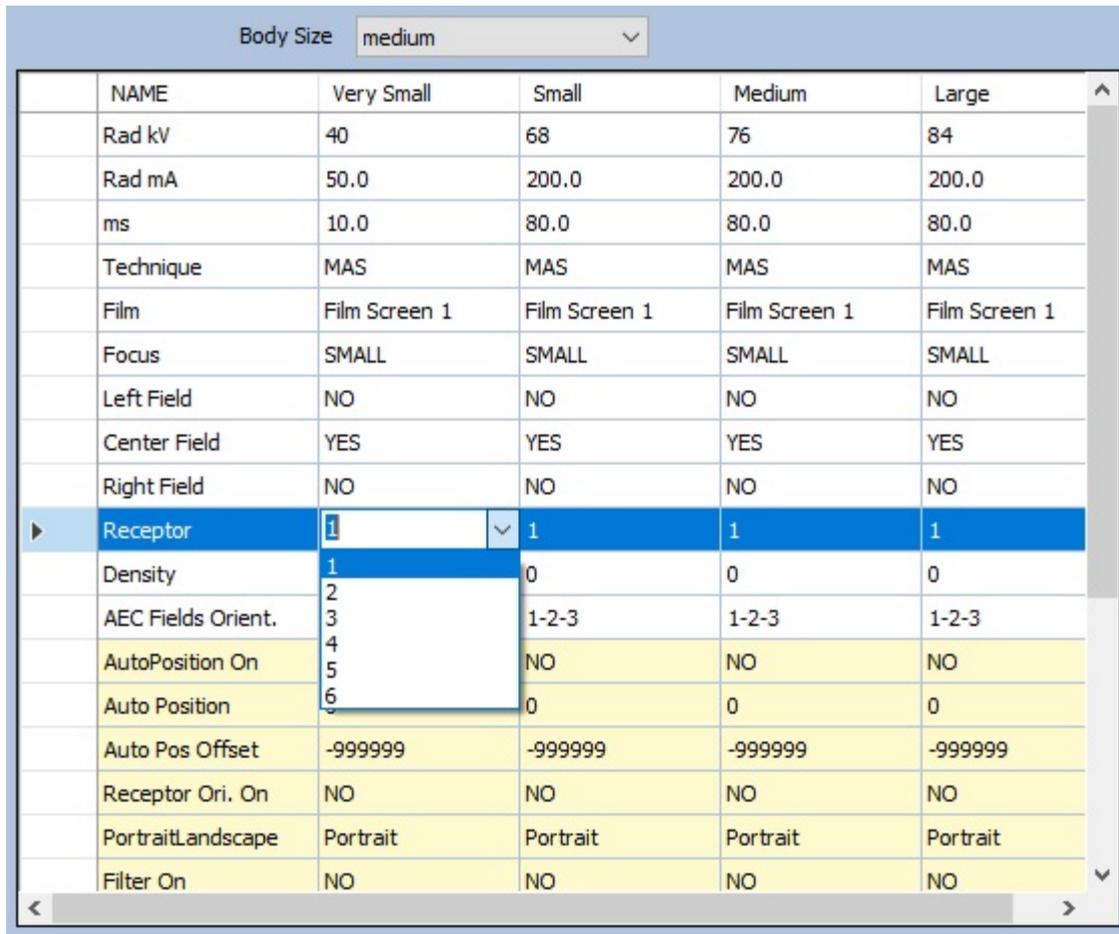
NAME	Very Small	Small	Medium	Large
Rad kV	40	68	76	84
Rad mA	50.0	200.0	200.0	200.0
ms	10.0	80.0	80.0	80.0
Technique	MAS	MAS	MAS	MAS
Film	Film Screen 1	Film Screen 1	Film Screen 1	Film Screen 1
Focus	SMALL	SMALL	SMALL	SMALL
Left Field	NO	NO	NO	NO
Center Field	YES	YES	YES	YES
Right Field	NO	NO	NO	NO
Receptor	1	1	1	1
Density	1 2 3 4 5 6	0	0	0
AEC Fields Orient.		1-2-3	1-2-3	1-2-3
AutoPosition On		NO	NO	NO
Auto Position		0	0	0
Auto Pos Offset	-999999	-999999	-999999	-999999
Receptor Ori. On	NO	NO	NO	NO
PortraitLandscape	Portrait	Portrait	Portrait	Portrait
Filter On	NO	NO	NO	NO

Body Size: medium

Receptor 1 = Table detector used inside Table bucky

Receptor 2 = Table detector used outside of bucky

Receptor 3 = Wallstand detector used inside Wallstand bucky

Receptor 4 = Wallstand detector used outside of bucky

Receptor 5 = Free detector

NOTE! The above is factory default as prepared by Arcoma. We strongly recommend to keep this configuration in order for electrical schematics and software settings to work and be consistent.

…or you can ask for the time of occurrence and the CPI overwrap log files to check the specific protocol:

```
"Log" Verbose 0 "[20190321 07:13:18.946] CanonControl.TransmitApr
[BODYSIZE]= MEDIUM"
"Log" Verbose 0 "[20190321 07:13:18.946] CanonControl.TransmitApr [APR-
ID]=
kV=75,mA=400,ms=2500,Technique=2,Film=1,Focus=1,LeftField=0,CenterField=1
,RightField=0,Receptor=3,Density=-
4,AECFieldsOrientation=0,AutoPosOn=0,AutoPosition=0,AutoPosOffset=-
999999,ReceptorOriOn=0,PortaitLandscape=0,FilterOn=1,Filter=0,CollimatorO
n=0,Transverse=3050,Longitudinal=3050,Centering=0,SourceToDetectorOn=0,So
urceToDetector=-
10;kV=140,mA=400,ms=10000,Technique=2,Film=1,Focus=1,LeftField=1,CenterFi
eld=1,RightField=1,Receptor=3,Density=0,AECFieldsOrientation=0,AutoPosO
n=0,AutoPosition=0,AutoPosOffset=-
999999,ReceptorOriOn=0,PortaitLandscape=0,FilterOn=1,Filter=3,CollimatorO
n=1,Transverse=3050,Longitudinal=3050,Centering=0,SourceToDetectorOn=0,So
urceToDetector=-
10;kV=140,mA=500,ms=10000,Technique=2,Film=1,Focus=1,LeftField=1,CenterFi
eld=1,RightField=1,Receptor=3,Density=0,AECFieldsOrientation=0,AutoPosO
n=0,AutoPosition=0,AutoPosOffset=-
999999,ReceptorOriOn=0,PortaitLandscape=0,FilterOn=1,Filter=3,CollimatorO
n=1,Transverse=3050,Longitudinal=3050,Centering=0,SourceToDetectorOn=0,So
urceToDetector=-
10;kV=140,mA=800,ms=10000,Technique=2,Film=0,Focus=1,LeftField=1,CenterFi
eld=1,RightField=1,Receptor=3,Density=0,AECFieldsOrientation=0,AutoPosOn=
0,AutoPosition=0,AutoPosOffset=-
999999,ReceptorOriOn=0,PortaitLandscape=0,FilterOn=1,Filter=3,CollimatorO
n=1,Transverse=3050,Longitudinal=3050,Centering=0,SourceToDetectorOn=0,So
urceToDetector=-10"
"Log" Verbose 0 "[20190321 07:13:18.948] TransmitApr params: "
"Log" Verbose 0 "[20190321 07:13:18.949]      Receptor = 3"
"Log" Verbose 0 "[20190321 07:13:18.949]      Focus = 1"
"Log" Verbose 0 "[20190321 07:13:18.949]      Technique = 2"
"Log" Verbose 0 "[20190321 07:13:18.949]      fields = 111"
"Log" Verbose 0 "[20190321 07:13:18.949]      filmscreen = 10"
"Log" Verbose 0 "[20190321 07:13:18.949]      Density = 0"
"Log" Verbose 0 "[20190321 07:13:18.949]      Kv = 140"
"Log" Verbose 0 "[20190321 07:13:18.949]      Ma = 500"
"Log" Verbose 0 "[20190321 07:13:18.949]      Ms = 10000"
"Log" Verbose 0 "[20190321 07:13:19.099] TransmitAPR SUCCESS"
"Log" Verbose 0 "[20190321 07:13:19.205] TableParamChange: send to table.
```

NOTE! The above log sequence shows how all the body size settings are transferred. The default body size is always MEDIUM (regardless if another size is selected in the upper menu of the protocol editor).

It is important that the same receptor is used for all body sizes in the same protocol.

STEP 2 -- Check settings in "Genconfig"

Compare Receptor settings with CPI overwrap by checking Genconfig.exe:
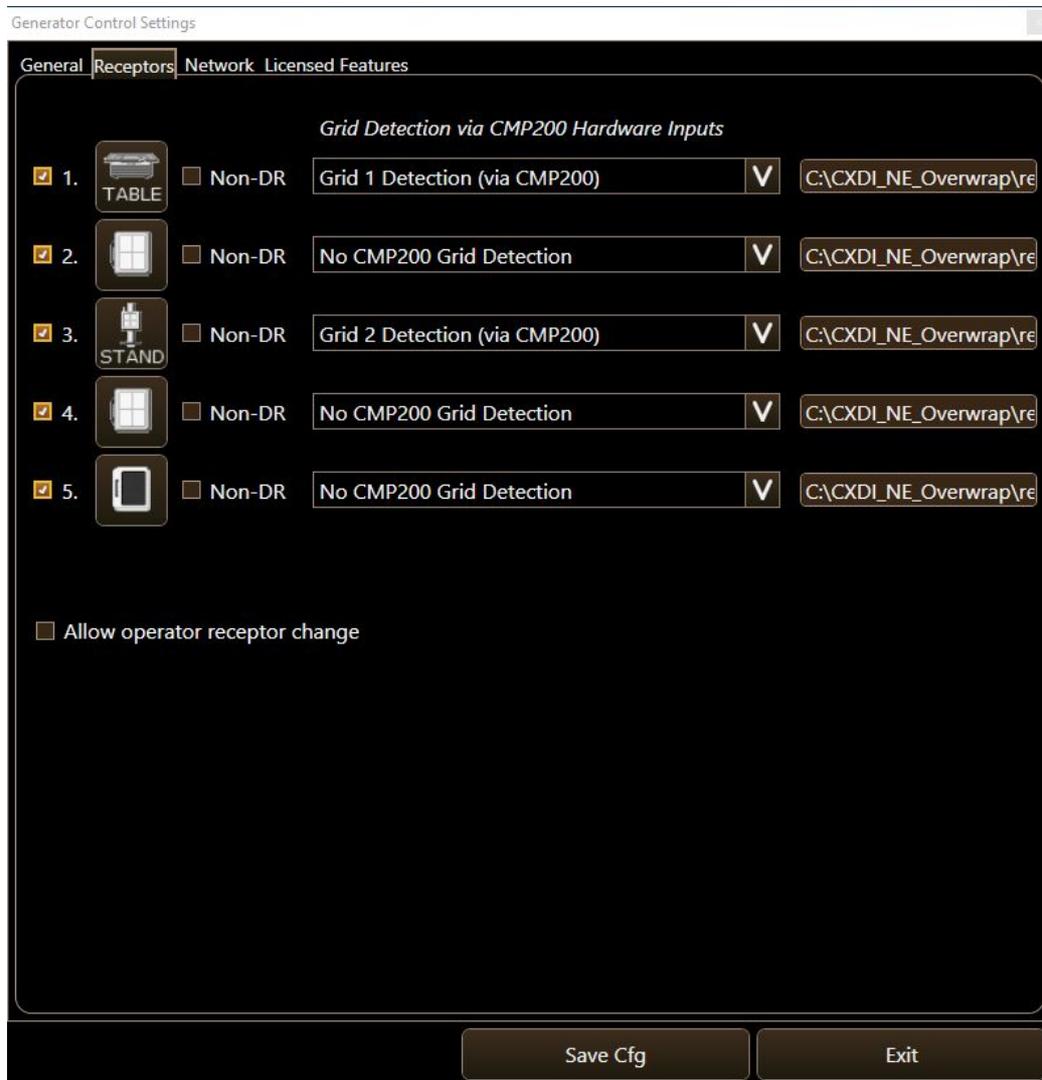
Receptor 1 = Table detector used inside Table bucky

Receptor 2 = Table detector used outside of bucky

Receptor 3 = Wallstand detector used inside Wallstand bucky

Receptor 4 = Wallstand detector used outside of bucky

Receptor 5 = Free detector

NOTE! The above is factory default as prepared by Arcoma. We strongly recommend to keep this configuration in order for electrical schematics and software settings to work and be consistent.

NOTE! If adjustments are needed to make Genconfig settings and protocol settings consistent, always change the protocol.

STEP 3 -- Check electrical connections and I/O settings in "Genware"

Open the Installation and Service manual (printed or digital version) and go to electrical drawings chapter.

Find the SBD-drawing that describes your detector configuration:

Electrical drawings
General
Page 8-1

8 Electrical drawings

Generator setup

Outputs

Receptor 1,2,3,4,5	Stand by	Prep	Gen Ready	Rad Exp.
Bucky 1 Start "J2 7-8"	☐	☐	☐	☒

Inputs

Receptor 1,2 Table	Stand by	Prep	Gen Ready	Rad Exp.
Bucky 1 Ready "J2 5-6"	☐	☐	☐	☐
Interlock 1 Ready "J2 3-4"	☐	☐	☐	☒
Bucky 2 Ready "J4 5-6"	☐	☐	☐	☐

Receptor 3,4 Wall stand	Stand by	Prep	Gen Ready	Rad Exp.
Bucky 1 Ready "J2 5-6"	☐	☐	☐	☐
Interlock 1 Ready "J2 3-4"	☐	☐	☐	☒
Bucky 2 Ready "J4 5-6"	☐	☐	☐	☐

Receptor 5 Free	Stand by	Prep	Gen Ready	Rad Exp.
Bucky 1 Ready "J2 5-6"	☐	☐	☐	☐
Interlock 1 Ready "J2 3-4"	☐	☐	☐	☒
Bucky 2 Ready "J4 5-6"	☐	☐	☐	☐

TS CXD_ 401_701C Wireless/charging
WS CX_ 401_701C Wireless/charging

4.DI/F01 — A1, A2, B1 (J2-3), B2 (J2-4)

Generator
AUX_PWB

J2-7
J2-8

UBD_ _ _e_system

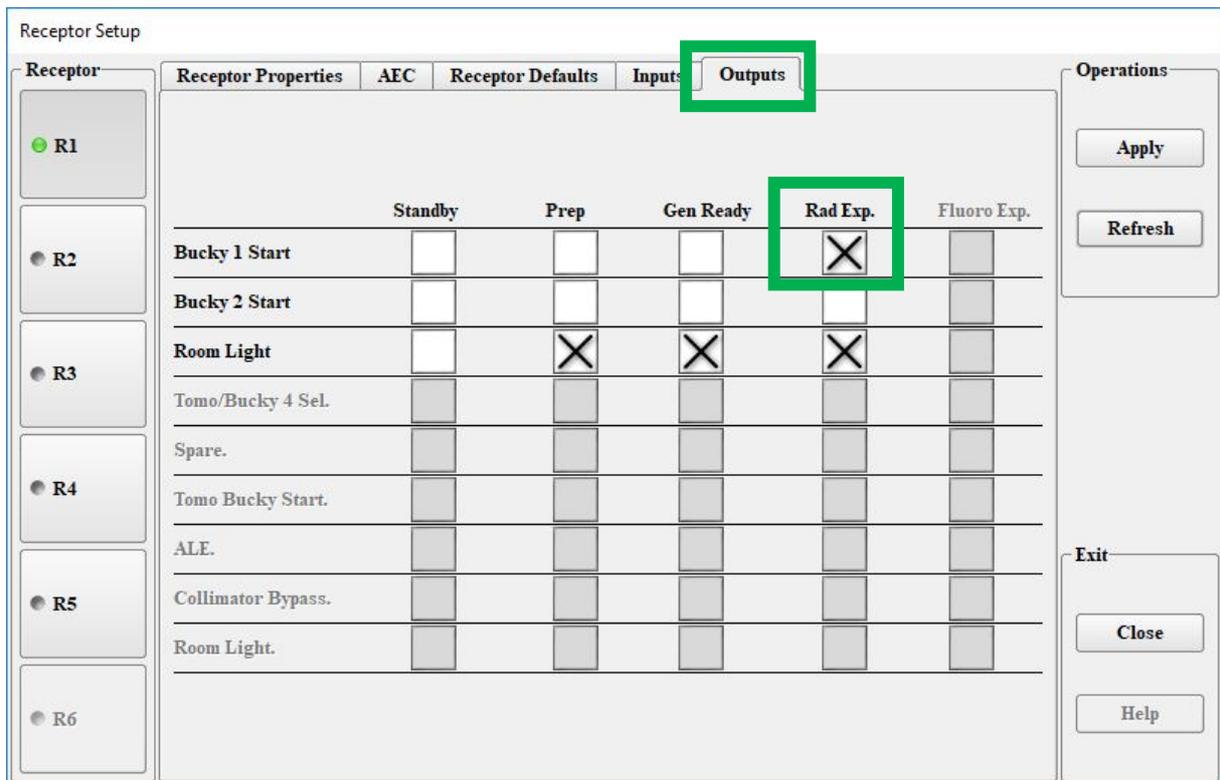Compare with actual settings in Genware   Compare with actual connections on generator

(see next page for references)

Check settings in Genware (service software for CPI CMP 200 generator) in the view "Rec" → "Inputs":
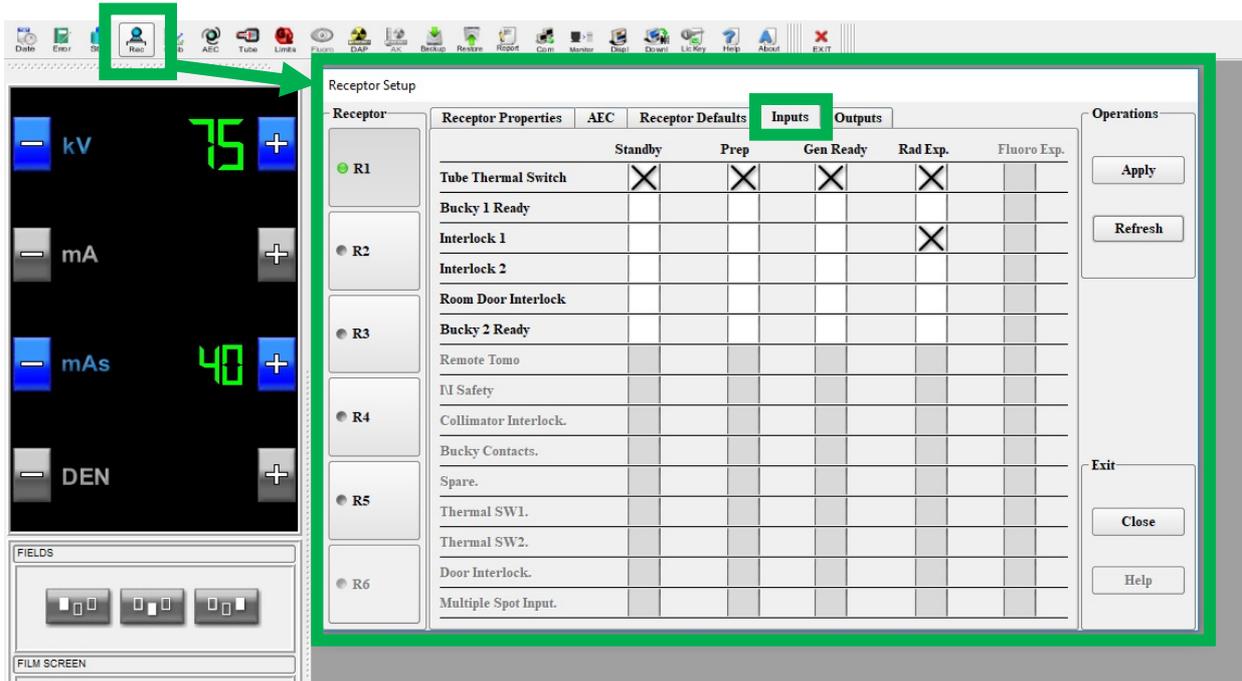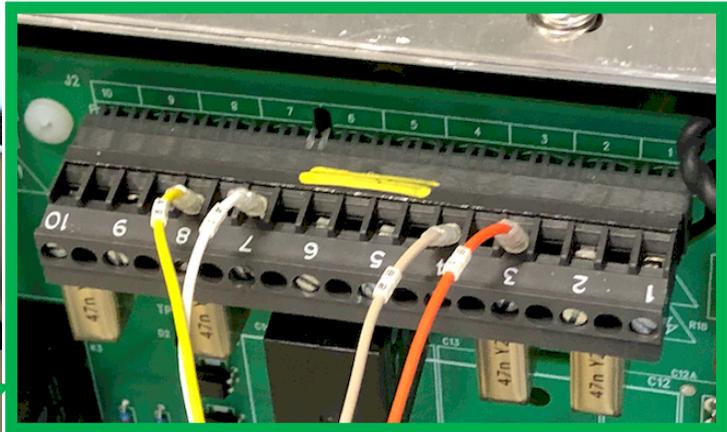

Also check the output setting – confirm "Bucky 1 Start" is selected at "Rad Exp." in the view "Rec" → "Outputs":

NOTE! *To view settings for the different receptors, change selection to the left (R1, R2, R3, R4, R5).*

Check the electrical connections of wires A1, A2, B1 and B2 on the generator:


These are the wires routed from Canon I/F box to CPI generator for requesting and receiving Detector Ready signals (sync-signals).

Confirm consistency between the SDB drawing for your system configuration and your actual connections. **Adjust connections if necessary.**

STEP 4 -- Check connections of sync-cables and functionality of I/F-box

If all previous steps are checked and OK but the problem remains, it is likely caused by;

    a)   sync-cables (damaged cables, bad connections) or
    b)   the Canon I/F box
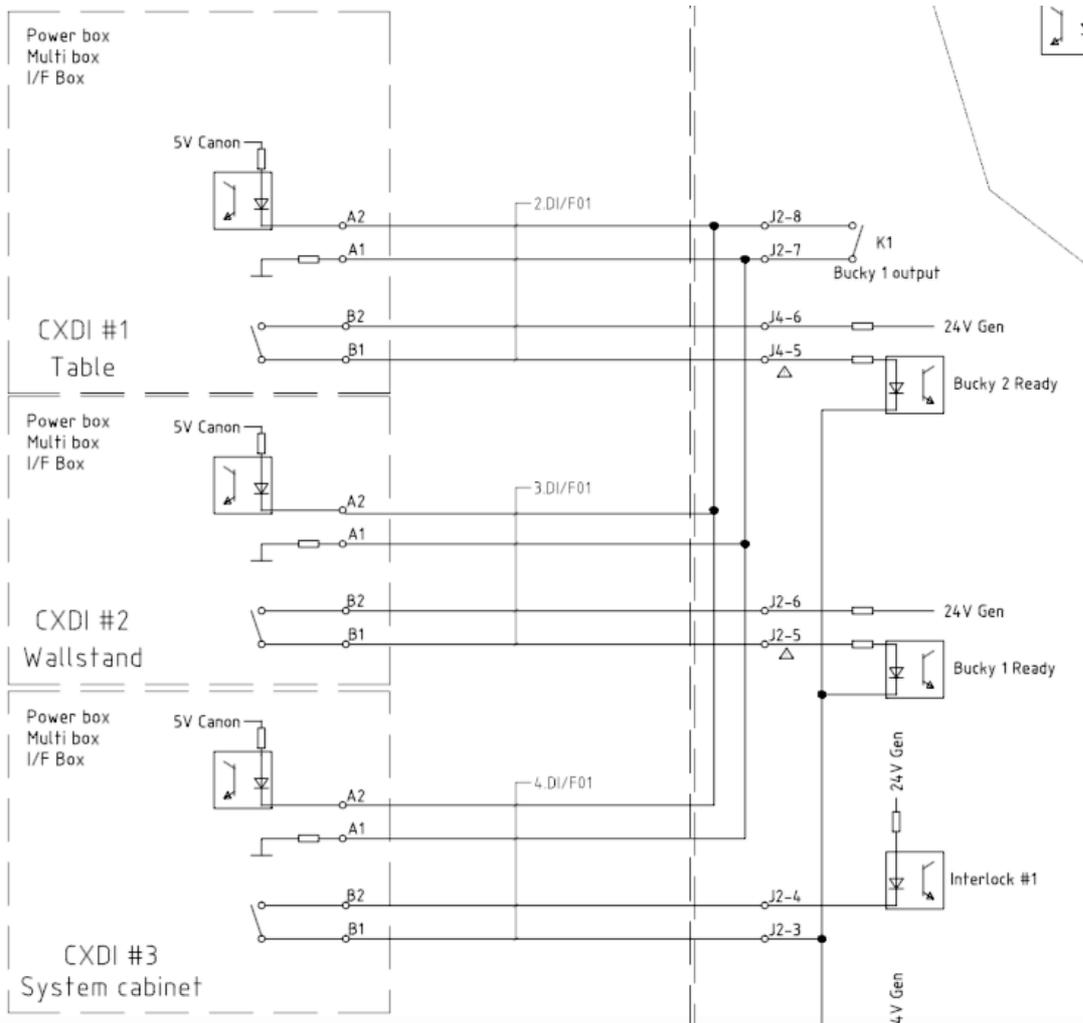
Output signals. When measuring between J2-7 and J2-8 in idle mode the voltage is 5 VDC. During exposure (when pressing exposure handle) the voltage drops to 0 VDC.

Input signals (output to Canon I/F box returning to input on generator). Can be measured for example between pin J4-6 and J4-5 for the input "Bucky 2 Ready". When in idle mode voltage is 24 VDC. During exposure (when pressing exposure handle) the voltage drops to 0 VDC.

(the above is difficult to measure with a volt meter – an oscilloscope is required to collect useful information)

If you suspect an issue with the inputs, try temporarily replacing B2 and B1 on the generator end with a jumper.

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