

# System Integration Guide



© Viewworks. 2023 All rights reserved.

Under copyright laws, this manual may not be reproduced, in whole or in part, without the written permission of Viewworks.

The specifications and related information in this manual may be changed without notice. Refer to Viewworks Download System (VDS) for the latest version of our manuals. This document is basically produced in English, and can be produced in the language of the relevant country upon request of the customer.

## Contents

<b>1. Document Guide .....</b>	<b>10</b>
<b>1.1 Symbols.....</b>	<b>10</b>
<b>1.2 Notations .....</b>	<b>11</b>
<b>2. Basic Exposure Process.....</b>	<b>12</b>
<b>3. Generator.....</b>	<b>13</b>
<b>3.1 Common Settings for Generator.....</b>	<b>13</b>
3.1.1 Generator Interlock Setting.....	13
3.1.2 How to Use Generator in VXvue .....	16
<b>3.2 GXR 68.....</b>	<b>19</b>
3.2.1 How to Set GXR Generator in VXSetup and VXvue.....	20
3.2.2 How to Set Generator in Procedure Manager in VXvue.....	21
3.2.3 How to Use the GXR Generator in VXvue .....	22
3.2.4 Error and Warning Messages of GXR Generator .....	23
<b>3.3 CPI .....</b>	<b>27</b>
3.3.1 How to Set Port from PC.....	27
3.3.2 How to Set CPI Generator in VXSetup and VXvue.....	28
3.3.3 How to Set Generator in Procedure Manager in VXvue.....	30
3.3.4 How to Use CPI Generator in VXvue .....	31
3.3.5 Error and Warning Messages of CPI Generator .....	33
<b>3.4 Sedecal .....</b>	<b>40</b>
3.4.1 How to Set Port from PC.....	40
3.4.2 How to Set Sedecal Generator in VXSetup VXvue .....	42
3.4.3 How to Set Generator in Procedure Manager in VXvue.....	43
3.4.4 How to Use Sedecal Generator in VXvue .....	44
3.4.5 Error and Warning Messages of Sedecal Generator .....	46
<b>3.5 Sedecal_WM .....</b>	<b>49</b>
3.5.1 How to Set Port from PC.....	49
3.5.2 How to Set Sedecal_WM in VXSetup and VXvue .....	51
3.5.3 How to Set the Sedecal_WM code in Procedure Manager in VXvue.....	52
3.5.4 How to Use Sedecal_WM in VXvue .....	54
<b>3.6 Siemens .....</b>	<b>57</b>
3.6.1 How to Set Port from PC.....	57
3.6.2 How to Set Siemens Generator in VXSetup and VXvue .....	59
3.6.3 How to Set Generator in Procedure Manager in VXvue.....	60

3.6.4	How to Use Siemens Generator in VXvue .....	60
<b>3.7</b>	<b>IMD .....</b>	<b>63</b>
3.7.1	How to Set Port from PC .....	63
3.7.2	How to Set IMD Generator in VXSetup and VXvue .....	64
3.7.3	How to Set Generator in Procedure Manager in VXvue .....	65
3.7.4	How to Use IMD Generator in VXvue .....	66
<b>3.8</b>	<b>SMAM .....</b>	<b>68</b>
3.8.1	How to Set Port from PC .....	68
3.8.2	How to Set SMAM Generator in VXSetup and VXvue .....	69
3.8.3	How to Set Generator in Procedure Manager in VXvue .....	71
3.8.4	How to Use SMAM Generator in VXvue .....	71
3.8.5	Error and Warning Messages of SMAM Generator .....	73
<b>3.9</b>	<b>Poskom (with VGI) .....</b>	<b>74</b>
3.9.1	How to Set Port from PC .....	74
3.9.2	How to Set Poskom Generator in VXSetup and VXvue .....	79
3.9.3	How to Set Generator in Procedure Manager in VXvue .....	80
3.9.4	How to Use Poskom Generator in VXvue .....	81
3.9.5	Error and Warning Messages of Poskom Generator .....	83
<b>3.10</b>	<b>DK .....</b>	<b>85</b>
3.10.1	How to Set Port from PC .....	85
3.10.2	How to Set DK Generator in VXSetup and VXvue .....	87
3.10.3	How to Set Generator in Procedure Manager in VXvue .....	89
3.10.4	How to Use DK Generator in VXvue .....	89
3.10.5	Error and Warning Messages of DK Generator .....	92
<b>3.11</b>	<b>IDETEC .....</b>	<b>93</b>
3.11.1	How to Set Port from PC .....	93
3.11.2	How to Set IDETEC Generator in VXSetup and VXvue .....	94
3.11.3	How to Set Generator in Procedure Manager in VXvue .....	96
3.11.4	How to Use IDETEC Generator in VXvue .....	96
3.11.5	Error and Warning Messages of IDETEC Generator .....	97
<b>3.12</b>	<b>DIRA .....</b>	<b>98</b>
3.12.1	How to Set Port from PC .....	98
3.12.2	How to Set DIRA Generator in VXSetup and VXvue .....	100
3.12.3	How to Set Generator in Procedure Manager in VXvue .....	101
3.12.4	How to Use DIRA Generator in VXvue .....	102
3.12.5	Error and Warning Messages of DIRA Generator .....	103
<b>3.13</b>	<b>HGHV .....</b>	<b>106</b>
3.13.1	How to Set Port from PC .....	106

3.13.2	How to Set HGHV Generator in VXSetup and VXvue.....	107
3.13.3	How to Set Generator in Procedure Manager in VXvue.....	108
3.13.4	How to Use HGHV Generator in VXvue .....	109
3.13.5	Error and Warning Messages of HGHV Generator .....	110
<b>3.14</b>	<b>Anthem (DEL) .....</b>	<b>113</b>
3.14.1	How to Install GS.....	113
3.14.2	How to Set Port from PC.....	114
3.14.3	How to Set Anthem Generator in VXSetup and VXvue.....	115
3.14.4	How to Set Generator in Procedure Manager in VXvue.....	117
3.14.5	How to Use Anthem (DEL) Generator in VXvue .....	118
3.14.6	Error and Warning Messages of Anthem (DEL) Generator .....	120
<b>3.15</b>	<b>CPI.CMP150 .....</b>	<b>122</b>
3.15.1	How to Install GS.....	122
3.15.2	How to Set Port from PC.....	123
3.15.3	How to Set CPI.CMP150 Generator in VXSetup and VXvue .....	124
3.15.4	How to Set Generator in Procedure Manager in VXvue.....	126
3.15.5	How to Use CPI.CMP150 Generator in VXvue .....	126
3.15.6	Error and Warning Messages of CPI.CMP150 Generator.....	127
<b>3.16</b>	<b>SYFM .....</b>	<b>132</b>
3.16.1	How to Install GS.....	132
3.16.2	How to Set Port from PC.....	133
3.16.3	How to Set SYFM Generator in VXSetup and VXvue.....	134
3.16.4	How to Set Generator in Procedure Manager in VXvue.....	136
3.16.5	How to Use SYFM Generator in VXvue.....	136
3.16.6	Error and Warning Messages of SYFM Generator .....	137
<b>3.17</b>	<b>Ecoray .....</b>	<b>139</b>
3.17.1	How to Install GS.....	139
3.17.2	How to Set Port from PC.....	140
3.17.3	How to Set Ecoray Generator in VXSetup and VXvue.....	141
3.17.4	How to Set Generator in Procedure Manager in VXvue.....	143
3.17.5	How to Use Ecoray Generator in VXvue.....	144
3.17.6	Error and Warning Messages of Ecoray Generator .....	145
<b>3.18</b>	<b>Sedecal.SHFR.....</b>	<b>147</b>
3.18.1	How to Install GS.....	147
3.18.2	How to Set Port from PC.....	148
3.18.3	How to Set Sedecal.SHFR Generator in VXSetup and VXvue.....	149
3.18.4	How to Set Generator in Procedure Manager in VXvue.....	151
3.18.5	How to Use Sedecal.SHFR Generator in VXvue .....	152
3.18.6	Error and Warning Messages of Sedecal.SHFR Generator.....	154

<b>3.19</b>	<b>GXR 52.....</b>	<b>160</b>
3.19.1	How to Install GS.....	160
3.19.2	How to Set GXR 52 Generator in VXSetup and VXvue.....	161
3.19.3	How to Set Generator in Procedure Manager in VXvue.....	163
3.19.4	How to Use GXR 52 Generator in VXvue.....	163
3.19.5	Error and Warning Messages of GXR.52 Generator.....	165
<b>3.20</b>	<b>Spellman.ZEUS .....</b>	<b>168</b>
3.20.1	How to Install GS.....	168
3.20.2	How to Set Port from PC.....	169
3.20.3	How to Set Spellman.ZEUS Generator in VXSetup and VXvue .....	170
3.20.4	How to Set Generator in Procedure Manager in VXvue.....	172
3.20.5	How to Use Spellman.ZEUS Generator in VXvue .....	172
3.20.6	Error and Warning Messages of Spellman.ZEUS Generator.....	174
<b>3.21</b>	<b>SPELLMAN.HFE .....</b>	<b>177</b>
3.21.1	Installing GS .....	177
3.21.2	How to Set Port from PC.....	178
3.21.3	How to Set SPELLMAN.HFE Generator in VXSetup and VXvue.....	180
3.21.4	How to Set Generator in Procedure Manager in VXvue.....	182
3.21.5	How to Use SPELLMAN.HFE Generator in VXvue .....	183
3.21.6	Error and Warning Messages of SPELLMAN.HFE Generator.....	185
<b>3.22</b>	<b>CPI.INDICO.IQ.....</b>	<b>187</b>
3.22.1	Installing GS .....	188
3.22.2	How to Set Port from PC.....	189
3.22.3	How to Set CPI.INDICO.IQ Generator in VXSetup and VXvue .....	190
3.22.4	How to Set Generator in Procedure Manager in VXvue.....	192
3.22.5	How to Use CPI.INDICO.IQ Generator in VXvue.....	193
3.22.6	Error and Warning Messages of CPI.INDICO.IQ Generator.....	194
<b>3.23</b>	<b>BMI.....</b>	<b>202</b>
3.23.1	Installing GS .....	202
3.23.2	How to Set Port from PC.....	203
3.23.3	How to Set BMI Generator in VXSetup and VXvue .....	204
3.23.4	How to Set Generator in Procedure Manager in VXvue.....	206
3.23.5	How to Use BMI Generator in VXvue .....	207
3.23.6	Error and Warning Messages of BMI Generator.....	208
<b>3.24</b>	<b>IBIS .....</b>	<b>210</b>
3.24.1	Installing GS .....	210
3.24.2	How to Set Port from PC.....	211
3.24.3	How to Set IBIS Generator in VXSetup and VXvue.....	213
3.24.4	How to Set Generator in Procedure Manager in VXvue.....	214

3.24.5	How to Use IBIS Generator in VXvue.....	215
3.24.6	Error and Warning Messages of IBIS Generator .....	216
<b>3.25</b>	<b>SMAM Revision.....</b>	<b>217</b>
3.25.1	Installing GS .....	217
3.25.2	How to Set Port from PC.....	218
3.25.3	How to Set SMAM Generator in VXSetup and VXvue.....	220
3.25.4	How to Set Generator in Procedure Manager in VXvue.....	222
3.25.5	How to Use SMAM Generator in VXvue .....	222
3.25.6	Error and Warning Messages of SMAM Generator.....	224
<b>3.26</b>	<b>POWERSITE.PSG.HR .....</b>	<b>226</b>
3.26.1	Installing GS .....	226
3.26.2	How to Set Port from PC.....	227
3.26.3	How to Set POWERSITE.PSG.HR Generator in VXSetup and VXvue .....	229
3.26.4	How to Set Generator in Procedure Manager in VXvue.....	231
3.26.5	How to Use POWERSITE.PSG.HR Generator in VXvue .....	231
3.26.6	Error and Warning Messages of POWERSITE.PSG.HR Generator.....	233
<b>4.</b>	<b>Collimator .....</b>	<b>236</b>
<b>4.1</b>	<b>Common Settings for Collimator.....</b>	<b>236</b>
4.1.1	Collimator Interlock Setting.....	236
4.1.2	How to Set Collimator from VXvue .....	237
4.1.3	How to Set Collimator from Procedure Manager.....	240
<b>4.2</b>	<b>RALCO R302DACS .....</b>	<b>241</b>
4.2.1	Preparing Integration.....	241
4.2.2	How to Set RALCO R302DACS Collimator in VXSetup .....	241
<b>4.3</b>	<b>RALCO.R225.ACS.....</b>	<b>243</b>
4.3.1	Preparing Integration.....	243
4.3.2	How to Install CS .....	243
4.3.3	How to Set RALCO.R225.ACS Collimator in VXSetup .....	244
<b>4.4</b>	<b>VAREX.OPTICA .....</b>	<b>246</b>
4.4.1	Preparing Integration.....	246
4.4.2	Installing CS.....	246
4.4.3	How to Set VAREX.OPTICA Collimator in VXSetup .....	247
<b>5.</b>	<b>Battery (UPS) .....</b>	<b>249</b>
<b>5.1</b>	<b>Common Settings for Battery.....</b>	<b>249</b>
5.1.1	Battery Interlock Setting.....	249
5.1.2	How to Use Battery in VXvue .....	249
<b>5.2</b>	<b>Riello DVR500 .....</b>	<b>251</b>

5.2.1	How to Install GS.....	251
5.2.2	How to Set Port from PC.....	252
5.2.3	How to Set Riello DVR500 Battery in VXSetup and VXvue.....	253
<b>6.</b>	<b>DAP.....</b>	<b>255</b>
<b>6.1</b>	<b>Common Settings for DAP.....</b>	<b>255</b>
6.1.1	DAP Interlock Setting.....	255
6.1.2	How to Specify the Location to Indicate DAP Value in VXvue.....	256
6.1.3	How to Use DAP in VXvue.....	257
<b>6.2</b>	<b>PTW C2 / E2.....</b>	<b>258</b>
6.2.1	How to Set Port from PC.....	258
6.2.2	How to Set PTW C2/E2 in VXvue and VXSetup.....	260
<b>6.3</b>	<b>VacuTec.....</b>	<b>261</b>
6.3.1	How to Set Port from PC.....	262
6.3.2	How to Set VXvue and VacuTec in VXSetup.....	264
<b>6.4</b>	<b>DMC.....</b>	<b>266</b>
6.4.1	How to Set Port from PC.....	266
6.4.2	How to Set DMC in VXvue and VXSetup.....	267
<b>6.5</b>	<b>IBA.....</b>	<b>269</b>
6.5.1	How to Set Port from PC.....	270
6.5.2	How to Set KermaX in VXvue and VXSetup.....	271
<b>7.</b>	<b>Equipment.....</b>	<b>272</b>
<b>7.1</b>	<b>Common Settings for Equipment.....</b>	<b>272</b>
7.1.1	Equipment Interlock Setting.....	272
7.1.2	How to Use Equipment in VXvue.....	272
<b>7.2</b>	<b>SYFM U-ARM.....</b>	<b>276</b>
7.2.1	How to Set SYFM U-ARM in VXSetup and VXvue.....	277
7.2.2	How to Set U-ARM in Procedure Manager in VXvue.....	278
7.2.3	How to Use SYFM U-ARM in VXvue.....	279
7.2.4	Auto Position.....	281
7.2.5	Integrating Exposure Control Module.....	283
<b>7.3</b>	<b>Roesys X-twin.....</b>	<b>285</b>
7.3.1	How to Install ES.....	286
7.3.2	How to Set Port from PC.....	287
7.3.3	How to Set X-twin (Rail) in VXSetup.....	288
7.3.4	How to Set X-twin(Rail) in Procedure Manager of VXvue.....	289
7.3.5	How to Use X-twin(Rail) in VXvue.....	289
7.3.6	How to Set APR.....	291

<b>8. System</b>	<b>293</b>
<b>8.1 Common Settings for System</b>	<b>293</b>
8.1.1 System Interlock Setting	293
8.1.2 How to Use System in VXvue	293
<b>8.2 SG Healthcare Jumong Mobile</b>	<b>297</b>
8.2.1 Installing VSS	297
8.2.2 How to Set Port from PC	298
8.2.3 How to Set VSS in VXSetup	300
8.2.4 Device Setting Mode of VXvue and VXSetup	301
8.2.5 How to Set System in Procedure Manager of VXvue	303
8.2.6 How to Use Jumong Mobile System in VXvue	303
8.2.7 Checking the Battery Level in VXvue	305
8.2.8 Error and Warning Messages of Jumong Mobile	306
<b>8.3 GR10X</b>	<b>310</b>
8.3.1 Installing VSS	310
8.3.2 How to Set Port from PC	311
8.3.3 How to Set VSS in VXSetup	313
8.3.4 Device Setting Mode of VXSetup and VXvue	314
8.3.5 How to Set System in Procedure Manager of VXvue	318
8.3.6 How to Use GR10X System in VXvue	326
8.3.7 Error and Warning Messages of GR10X Mobile	328
<b>8.4 Micro-X Rover</b>	<b>333</b>
8.4.1 Installing VSS	333
8.4.2 How to Set VSS in VXSetup	334
8.4.3 Device Setting Mode of VXSetup and VXvue	336
8.4.4 How to Set System in Procedure Manager of VXvue	337
8.4.5 How to Use System in VXvue	337
8.4.6 How to Check Battery Remains in VXvue	339
8.4.7 Error and Warning Messages of GR10X Mobile	340
<b>8.5 Vieworks</b>	<b>350</b>
8.5.1 Installing VSS	350
8.5.2 How to Set Port from PC	351
8.5.3 How to Set VSS in VXSetup	353
8.5.4 Setting System Device in VXSetup and VXvue	354
8.5.5 How to Set System in Procedure Manager of VXvue	359
8.5.6 How to Use CPI Generator in VXvue	360
8.5.7 Error and Warning Messages	362
<b>9. Additional Function for Integration</b>	<b>391</b>

<b>9.1</b>	<b>How to Use the Second Monitor .....</b>	<b>391</b>
9.1.1	How to Interlock Second Monitor .....	391
9.1.2	How to Use the Second Monitor in VXvue.....	392
9.1.3	Sample Screen.....	394
<b>10.</b>	<b>Revision History.....</b>	<b>398</b>

## 1. Document Guide

This guide provides information about the integration way of medical devices including X-ray generator with the viewer program and about the settings of relevant menus.

### Target

This guide is intended for service engineers who configure and maintain medical devices including X-ray generator and the viewer program.

### Contact Department

- This manual is provided in print format upon request by the customer.
- For comments or inquiries regarding this document and relevant products, contact via email below:

Item	Contents
Department	Customer Support Team at Vieworks
E-mail	<a href="mailto:CustomerSupport@vieworks.com">CustomerSupport@vieworks.com</a>



- You can download this manual from VDS (Vieworks Download System) website: <https://clouds.vieworks.com:5001/>. To obtain an ID and password for manual download, please contact the customer support team in Vieworks.

### Version Information

This document is written based on **VXvue V1.0.7**

## 1.1 Symbols

Before attempting to use Vieworks' product, follow the instructions in this manual along with the information symbol. It is important for you to read and understand the contents of this manual for operating the product safely.

### Caution



- This symbol is used to indicate a potentially hazardous situation that may cause death, personal injury or substantial property damage if the instructions are ignored. Users should be well acquainted with this symbol and the related contents.

### Information



- This symbol is used for indicating product related references and supplementary information. Users are recommended to read the sentences with this notice carefully.

## 1.2 Notations

### **Bold Types**

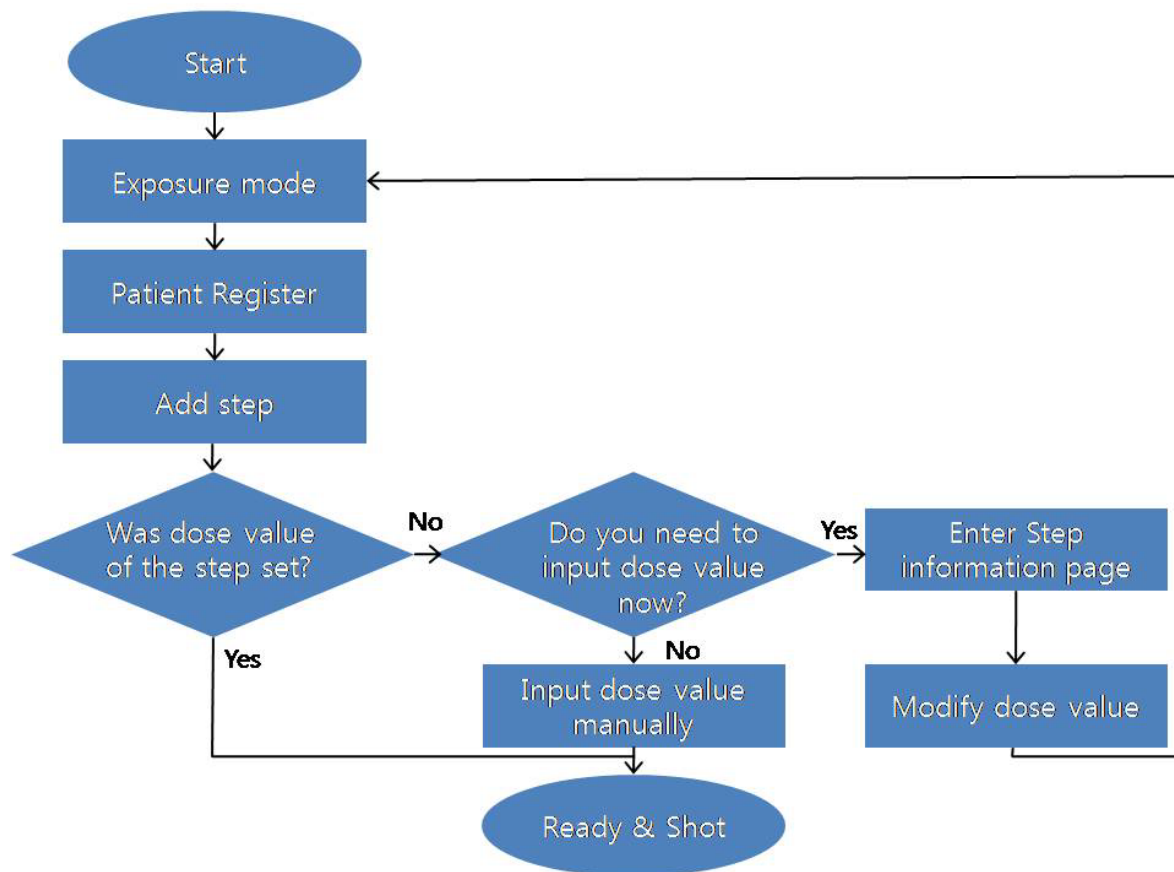
Words in bold indicate products terms, or the sentences which are needed to transmit clear meaning to the customers.

### **Product Name**

In this document, the product names of other companies are written based on their UI (User Interface) displayed in **VXSetup** and **VXvue**.

## 2. Basic Exposure Process

You can make an X-ray exposure with the following steps basically.



### Definition of Terms

The terms used in this guide are defined as follows.

Term	Definition
<b>Bucky</b>	A device combined with the X-ray system as a table or wall format. The user can insert cassette or grid to bucky.
<b>Receptor</b>	A subject that can make an image from exposed radiation. Its conceptual meaning also covers a film or a detector.
<b>Control, Adjust</b>	Means to show the received value or to send values to the equipment without operating it directly.
<b>Echo</b>	Checks connecting status by sending a reset command to the selected device.

### 3. Generator

#### 3.1 Common Settings for Generator

##### 3.1.1 Generator Interlock Setting

###### Direct Linkage Method

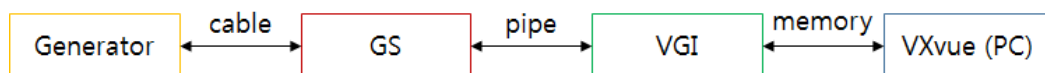


- **VXvue** uses the generator module file to communicate directly with the cable between the PC and the generator.
- The commands and data required for interworking conform to the protocols of the interworking generator.



- Refer to the generator Integration settings file (xml) section below for Integration functions and dose table.
- The module file may communicate with the control program or SDK produced by the generator manufacturer.

###### VGI Linkage Method



- **VXvue** communicates with the generator control program (GS) using the interface (VGI) included in **VXvue**. GS communicates directly with the generator.
  - Ex) Ecoray Generator Integration – Installing GS and configuring in VXSetup
- **VGI** stands for Viewworks Generator Interface and is the communication protocol of Viewworks Inc.
  - For protocol specifications and detailed information on VGI, please contact the person in charge of Viewworks.
- Generator Service, abbreviated to **GS**, is the middleware between VGI and Generator.
  - The commands and data required for interworking between **GS** and Generator conform to **Generator** protocol specifications.
  - The commands and data required for interworking between **GS** and VGI conform to **VGI** protocol specifications.



- Refer to the generator Integration settings file (xml) section below for Integration functions and dose table.
- The generator link setting file of VGI should have the same name as the GS execution file and must be in the same folder so that the setting file works normally.
  - E.g., Sample.GS.xml should be in the folder where Sample.GS.exe is located.

### Configuration File for Integrating Generator (xml)

- The configuration file must exist with the same file name in the location of the generator module file or in the location of the GS execution file to work properly with **VXvue**.
  - E.g. 1) If there is '[VXvue Installation folder]\Generator\Generator.Product.dll', 'Generator.Product.xml' should be located in the same folder.
  - E.g. 2) If there is '[GS Installation folder]\GS.Product.exe', 'GS.Product.xml' should be located in the same folder.
- The file format of a generator link configuration file is xml and can be modified by using the notepad program if you need to change the generator function or to change the dose table.
- VXvue provides default settings for each generator when it is installed. See the property table below for details.
  - In the following table, 'Step' means Bodypart-Projection which can set the dose value of generator using the Procedure Manager function. See <3.1.2 Using Generator in VXvue> for details of the Procedure Manager function



- If you modify the <Information> section, the linkage between the generator and VXvue may not work properly.
  - E.g. <Information Product="PRODUCT" ProductNo="99" Model="MODEL" />
- The lower part of <QueryFunction> can be modified, but the generator and VXvue must be properly linked according to the property value. Refer to the table below for details.

Property Value	Form	Description
<b>Support3PMode</b>	Enabled(1), Disabled(0)	Supports 3P mode (Simultaneous adjustment of KVp, mA, ms)
<b>Support2PMode</b>	Enabled(1), Disabled(0)	Supports 2P mode (Simultaneous adjustment of kVp and mAs)
<b>kvControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of kVp
<b>mAin3PControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of mA under 3P mode.
<b>mAin2PControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of mA under 2P mode.
<b>mAsConrol</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of mAs
<b>msControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of ms
<b>mAinAECControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of mA under AEC mode.
<b>mAsinAECControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of mAs under AEC mode. (Limit)
<b>msinAECControl</b>	Enabled(1), Disabled(0)	Supports simultaneous adjustment of ms under AEC mode. (Limit)
<b>mAinAEC3PControl</b>	Enabled(1), Disabled(0)	Supports mA control in AEC mode (Backup ms)
<b>mAsinAEC3PControl</b>	Enabled(1), Disabled(0)	Supports mAs control in AEC mode (Backup ms)
<b>msinAEC3PControl</b>	Enabled(1), Disabled(0)	Supports ms control in AEC mode (Backup ms)

<b>FocusControl</b>	Enabled(1), Disabled(0)	Supports direct focus adjustment by user.
<b>FocusIndirectControl</b>	Enabled(1), Disabled(0)	Supports focus input configured in step.
<b>SupportAEC</b>	Enabled(1), Disabled(0)	Supports AEC mode.
<b>SupportAECDensity</b>	Enabled(1), Disabled(0)	Supports adjustment of density under AEC mode.
<b>SupportAECFilmSpeed</b>	Enabled(1), Disabled(0)	Supports adjustment of film speed under AEC mode.
<b>ErrorResetable</b>	Enabled(1), Disabled(0)	Resets the error.
<b>ErrorBeep</b>	Enabled(1), Disabled(0)	The PC generates forced beep when error occurs.
<b>ErrorResetUI</b>	Enabled(1), Disabled(0)	Resets error only in UI (cannot check whether the error is actually reset or not.)
<b>SupportReceptorMapping</b>	Enabled(1), Disabled(0)	Supports mapping between the detector and receptor
<b>SupportReorderReceptorList</b>	Enabled(1), Disabled(0)	Reorder the receptor from the receptor list.
<b>SupportBuckyMapping</b>	Enabled(1), Disabled(0)	Supports mapping between receptor and bucky (Bucky icon can be set and displayed in UI.)
<b>SupportHU</b>	Enabled(1), Disabled(0)	Supports HU
<b>SupportExposuredDose</b>	Enabled(1), Disabled(0)	Records actual dose value on the image.
<b>SupportExposureEnable</b>	Enabled(1), Disabled(0)	Sends signals when shooting is possible.
<b>SupportReconnectDevice</b>	Enabled(1), Disabled(0)	Supports reconnection of the generator.
<b>SupportDAP</b>	Enabled(1), Disabled(0)	Using DAP connected to the generator.
<b>CanUseSecondMonitor</b>	Enabled(1), Disabled(0)	Using the second monitor
<b>UseBackupMas</b>	Enabled(1), Disabled(0)	Possible to set backup (AEC Limited) mAs in step.
<b>UseReceptorInStep</b>	Enabled(1), Disabled(0)	Possible to set receptor to be used in step.
<b>DefaultValue</b>	All integers	Dose default if step is not set.
<b>DefaultAECValue</b>	Left, Center, Right (each) Enabled(1), Disabled(0)	Chamber value selected by default when changing from AEC off to on
<b>KV</b>	Min, Max, 0 ~ 999	Dose Table: kVp, min. to max. range
<b>MA</b>	Input per piece (0.01~999999.99)	Dose Table : mA
<b>MS</b>	Input per piece (0.01~999999.99)	Dose Table : ms
<b>MAS</b>	Input per piece (0.01~999999.99)	Dose Table : mAs
<b>Density</b>	Input per piece (-30.00~30.00)	Dose Table : AEC Density
<b>FilmSpeed</b>	Up to 10 inputs, text	Dose Table : AEC Film Speed (Sensitivity)



- For an example of the generator link setting file, please refer to the folder where VXvue is installed (₩ GENERATOR ₩ GENERATOR.VIRTUAL.xml).

### 3.1.2 How to Use Generator in VXvue



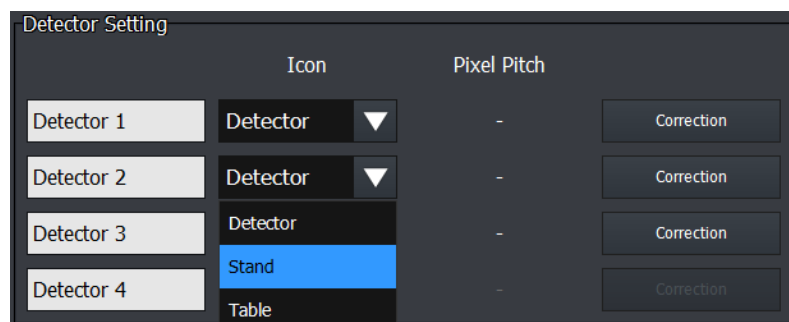
- When interlocking an equipment to VSI (Vieworks System Interface), **Setting – Generator Menu** is not displayed. For more information, please contact to Vieworks.

#### Setting Receptor Icon

You can substitute **Receptor(Bucky)** icon for the **Detector icon** shown in the **Exposure tab** to install Detector.

#### Setting method

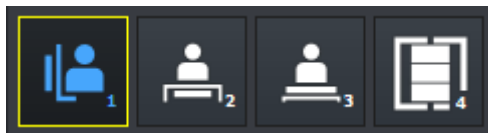
1 Go to **Setting → Integration → Detector** in VXvue and select the **Receptor(Bucky)** icon for Detector mapping.






- Detector** icon setting is mapped in order of **1, 2, 3, 4 Detector** on the **VXvue - Exposure** screen.




2 Click the **Update** button at top left.

3 Check if the **Detector panel** icon is successfully changed from **Exposure Tab** in **VXvue**.



#### Icon list configurable to Detector

Icon	Selected Option
 	Detector
	Stand

	Table
	Table Top
	No Bucky

### Setting Beep Sound

Option

☐ Use beep sound

☐ Use step dose value when changing dose mode

Beeping sound is made when X-ray is generated with the marked **Use beep sound** item.

- Output time of Beeping sound is mAs / 100 (mS) when on the mAs mode.

### Applying Dose Value Configured in Step when Changing Dose Mode

- Tick the **Use step dose value when changing dose mode** item and apply the dose value configured in Step when changing dose mode.
- Values related to **AEC**, such as **AEC Field** and **AEC Density AEC** modes are all applied when on **AEC** mode.

### Mapping Receptor(Bucky) and Detector

When selecting **Detector/Receptor** for exposure from **Exposure tab** after mapping **Receptor** and **Detector**, the selected device and mapped equipment are automatically configurable.



- The **Detector** mapped to Receptor is automatically selected if you select **Receptor** from **Exposure tab** when mapping **Receptor**.
- The **Receptor** mapped to Detector is automatically selected if you select **Detector** from **Exposure tab** when mapping **Receptor**.

### Setting Method

- 1 Go to **Setting** → **Integration** → **Generator**.
- 2 Go to **Receptor Selector** and establish the actual name used in generator on Receptor(Bucky), which Detector is mapped to.

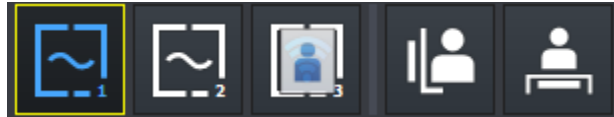
Receptor Selector

Stand: 1 ▼ Table: 2 ▼

Table Top: -None- ▼ No Bucky: -None- ▼



- Select **-None-** for a **Receptor** not in use to disable mapping setting.
- **Receptor name** shown when clicking the ▼ button is the characteristic value that identifies Receptor, and it can be displayed on VXvue as a configured Receptor list from Generator.
- Duplicated name cannot be selected from **more than 2 Receptors**.



- Only the receptor icon which name is mapped is shown on the screen.
- **Stand/Table/Table Top/No Bucky** icons are also added to **Detector** icon on **VXvue – Exposure** mode in the configured **Receptor**.
- If you select the **Receptor** icon, the configured Receptor and the **Detector** mapped to the Receptor are automatically set.

3 Choose the Detector for each Receptor.

Receptor	Detector 1	Detector 2	Detector 3
1	17x17S - Virtual00001(DR)	14x17W - Virtual00003(AED)	
2		14x17S - Virtual00002(DR)	
3			




- The maximum **Detector** you can map to one **Receptor** is 3.
- When using a **Receptor** with multiple **Detectors** mapped, Detector is prioritized **in the order of mapping**.
- When using a **Receptor** with multiple **Detectors** mapped, the first **Detector** is automatically selected.
- When mapping the same Detector to multiple Receptors, the uppermost Receptor is automatically selected.



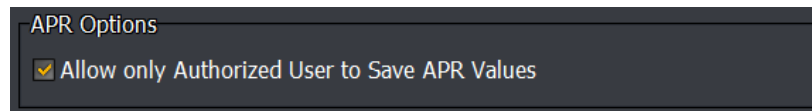
- **Receptor** mapping may not be applied depending on a type of **Generator**.
- This function does not appear when Receptor mapping is not supported.

### Saving and using the current dose condition in Step


When connecting VXvue and the generator using the software virtual console, click  (**Save Dose**) button from **VXvue – Exposure tab** to set the current dose condition (kVp, mA, ms, mAs, Focal Spot, AEC density) as a default.

### Setting APR (Anatomic Programming Radiography) Option

If the following option is selected in Setting > Integration > General, only users with Service or Admin privileges can save the generator's investigation conditions in Steps.



### Recalling and using the dose condition (used in the previous shooting)

When using the software virtual console to link VXvue and the generator, clicking  (**Reload**) button from **VXvue – Exposure tab** recalls the dose condition and system condition used during the previous shooting and can be set as the conditions for shooting in the generator.

## 3.2 GXR 68

This section explains about the integration process between **VXvue** and the **GXR 68** generator, through the SDK tool '**GXR\_SDK\_10626.exe**' made by DRGEM Co., Ltd.

### Interlock Condition

- **GXR** generator can be integrated with **VXvue** (Viewer) as the software-driven way, which is communicated through the console software of **GXR** generator and **VXvue**. To make the integration process, install the console software of **GXR** generator first, and check if it runs normally.
- Connect the console software of **GXR** generator and connect PC with a generator cable. (RS-232C)

### Integrated Model

- **GXR 68**
- Supports **GXR SDK 1.06.26**

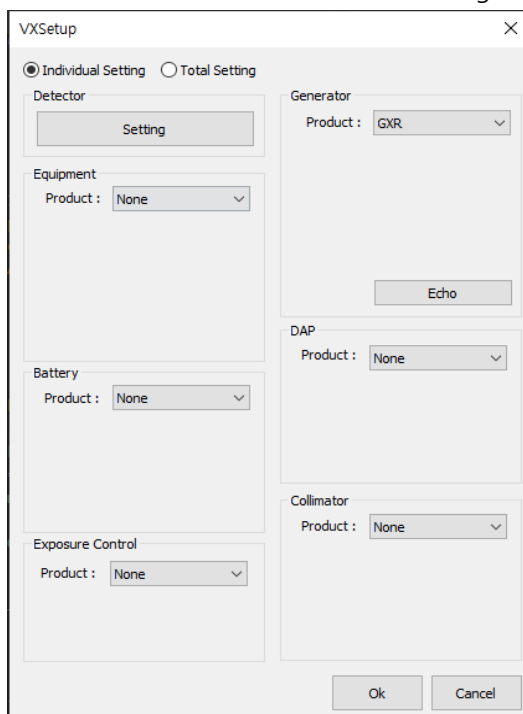


- Models other than **DRGEM** Generator GXR 68 may not be integrated with the viewer program depending on the specifications.
- The generator can malfunction if the integrated SDK version is different.
- To integrate an old GXR generator without **GXR SDK**, please contact a person in charge in Viewworks.

### 3.2.1 How to Set GXR Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of **GXR** from the **Generator** menu as follows.
  - Product: **GXR**
- 3 Click the **Echo** button to check the connecting status.



- 4 Click the **OK** button to save the settings.



- Be sure to check if the power of GXR generator is turned on before setting the generator in VXSetup.
- Run the GXR software and select the **GXR SDK Tool** option to log on.

## VXvue



- The **GXR** generator is integrated directly with **VXvue**.
- Refer to the front part of the <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.2.2 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from **Setting** mode → **Procedure** → **Procedure Manager** panel in **VXvue**.  
 ▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient...	Dose Mode	kVp	mAs	mA	ms
Abdomen Erect	Large	Current	50	1	100	10
Abdomen Erect	Medium	Current	50	1	100	10
Abdomen Erect	Small	Current	50	1	100	10
Abdomen Erect	Pediatric	Current	50	1	100	10
Abdomen KUB	Large	Current	50	1	100	10
Abdomen KUB	Medium	Current	50	1	100	10
Abdomen KUB	Small	Current	50	1	100	10
Abdomen KUB	Pediatric	Current	50	1	100	10
Abdomen Supine	Large	Current	50	1	100	10
Abdomen Supine	Medium	Current	50	1	100	10
Abdomen Supine	Small	Current	50	1	100	10
Abdomen Supine	Pediatric	Current	50	1	100	10



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than **Current** in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.2.3 How to Use the GXR Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

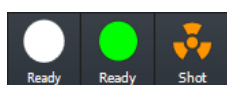
- You can adjust **kVp** and **mAs**, and **ms**. (3 points)

<b>70</b>	kVp	▲ ▼	<b>20</b>	mAs	▲ ▼
<b>200</b>	mA	▲ ▼	<b>100</b>	ms	▲ ▼

#### Icons

The icons disabled in UI (User Interface) are not supported when the viewer program is integrated with the **GXR** generator.

Icon	Name	Description
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> , <b>ms</b> can be adjusted.
	<b>Focal Spot Size (Small / Large)</b>	Focal Spot Size is changed automatically depending on the mA setting of generators, or the user can change it manually.
	<b>Reset</b>	<p>The <b>Reset</b> icon is activated, and an error message is indicated when a soluble error occurs by resetting the system.</p> <p>Click the icon at this time to start reset.</p>
	<b>Heat Units (Anode)</b>	<p>The color of icon changes according to the heat units.</p> <ul style="list-style-type: none"> <li>• 0&lt;HU≤50: Green</li> <li>• 50&lt;HU≤80: Yellow</li> <li>• 80&lt;HU: Red</li> </ul>



### X-ray Status

The icons and their color are changed depending on the status of generator.

- **Ready** (White) – Standby
- **Ready** (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.
- **Shot** (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### Error Message

- The general error and warning messages are indicated as slides.
  - Red color : error / Yellow color : warning

### 3.2.4 Error and Warning Messages of GXR Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The **Reset** button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Messages

Code	Error Message	Description
1	TXRX NO ANSWER	Generator has detected error in communication to console.
2	NVSRAM FAIL ERROR	Generator has detected error in saving data to NVSRAM in HT Control PCB.
3	CHARGE ERROR	Insufficient power supply.
4	IGBT1 FAULT	Over-current protection at IGBT of power-stack. Line voltage drop due to insufficient power supply.
5	IGBT2 FAULT	Tube Arcing: Tube arcing can induces over-current drive of IGBT module. Over-Heat protection at IGBT of power-stack. Damage of IGBT. In this case, cannot expose X-ray with any lower parameters.
6	TUBE TEMPERATURE	X-ray tube is too hot and its thermal switch is activated.
7	FAULT SENSING ERROR	Error signal detected although no error occurred.
16	OVER MA - HARDWARE	The output mA exceeded the maximum allowed mA limit. (109mA: 10~64mA, 1090mA: 80~1000mA). Tube arcing or mA calibration data is abnormal.
17	OVER KV - HARDWARE	The output kV exceeded the maximum allowed kV limit. (194kV)

		kV calibration data is abnormal.
18	<b>KV INEQUALITY 1</b>	Anode kV feedback voltage is higher than cathode kV feedback voltage.
19	<b>KV INEQUALITY 2</b>	Cathode kV feedback voltage is higher than anode kV feedback voltage.
20	<b>CAL DATA EMPTY</b>	mA calibration data is empty with selected kV, mA step.
21	<b>FIL1 SELECT ERROR</b>	Small focus selection is not operating.
22	<b>FIL2 SELECT ERROR</b>	Large focus selection is not operating.
23	<b>OVER MA - SOFTWARE</b>	The output mA exceeded the maximum allowed mA limit.
24	<b>HEAT UNIT ERROR</b>	Anode heat unit exceeded 90% of total HU. In this case, x-ray exposure is not possible.
25	<b>ROTOR ACCEL CURRENT LOW ERROR</b>	Indicates that insufficient current was sensed in boost state of rotor.
32	<b>ROTOR RUNNING CURRENT LOW ERROR</b>	Indicates that insufficient current was sensed in running state of rotor.
33	<b>DSS IPM FAULT</b>	Indicates that IPM fault signal of DSS board is detected.
34	<b>ROTOR ACCEL CURRENT HIGH ERROR</b>	Indicates that over current was sensed in boost state of rotor.
35	<b>ROTOR RUNNING CURRENT HIGH ERROR</b>	Indicates that over current was sensed in running state of rotor.
36	<b>DSS UNDER VOLTAGE ERROR</b>	Indicates that under voltage was sensed in DSS rectifier board.
37	<b>DSS HARDWARE ERROR</b>	Indicates that stator cables are misconnected.
38	<b>DSS SPEED SELECT ERROR</b>	Indicates that error about starter speed selection was sensed.
39	<b>AEC RAMP ERROR</b>	The ramp voltage fails to reach 10% of the expected ramp voltage when the exposure time reaches 20% of the selected AEC backup time.
40	<b>AEC INT ERROR</b>	AEC exposure signal detected without X-ray exposure.
41	<b>AEC MAS ERROR</b>	AEC exposure exceeded maximum mAs.
48	<b>AEC BUT ERROR</b>	AEC exposure exceeded maximum back up time.
49	<b>DR READY SET</b>	DR interface signal is abnormal.
50	<b>TOMO SET ERROR</b>	TOMO exposure exceeded back-up time.
51	<b>BUCKY1 FEEDBACK ERROR</b>	Feedback of Bucky1 does not detect during Bucky delay time.
52	<b>BUCKY2 FEEDBACK ERROR</b>	Feedback of Bucky2 does not detect during Bucky delay time.
53	<b>CHARGE. MC. FAIL ERROR</b>	Charge magnet switch is not operating.
54	<b>EXT. MC. FAIL ERROR</b>	External magnet switch is not operating.
55	<b>MAIN MC. FAIL ERROR</b>	Main magnet switch is not operating.
56	<b>GEN DUTY ERROR</b>	Overheat of Power-stack Assy.
64	<b>FIL PREHEAT LOW</b>	Filament preheat level of x-ray tube is lower than pre-programmed limit.
65	<b>FIL PREHEAT HIGH</b>	Filament preheat level of x-ray tube is higher than pre-programmed limit.

66	FIL READY LOW	Filament ready level of x-ray tube is lower than pre-programmed limit.
67	FIL READY HIGH	Filament ready level of x-ray tube is higher than pre-programmed limit.
68	FIL_SMALL ERROR	Small Filament current does not detect.
69	FIL_LARGE ERROR	Large Filament current does not detect.
70	DOOR INTERLOCK	Door Interlock is open.
71	EXT INTERLOCK	External interlock is open.
72	HT TXRX NO ANSWER	Console has detected error in communication with Generator.
73	AEC DATA EMPTY	AEC Calibration has not performed. AEC calibration data is empty.

### Warning Messages

Code	Warning Message	Description
96	CRC Fail	CRC fail of communication data from HT controller to Console
97	VDC Low Level	Low DC voltage from the Auxiliary Transformer output
98	SMPS Low Voltage	Low DC voltage from SMPS output
99	Exp. Switch Release	During X-ray exposure, exposure switch is released before exposure time is over. In this case, the actual exposure time is displayed on the screen.
100	kV Feedback Abnormal	Abnormal kV feedback value is sensed
101	mA Feedback Abnormal	Abnormal mA feedback value is sensed
80	kV Low - Software	MCU in HT controller detected lower feedback value than kV set value error range
81	kV High - Software	MCU in HT controller detected higher feedback value than kV set value error range
82	mA Low - Software	MCU in HT controller detected lower feedback value than mA set value error range
83	mA High - Software	MCU in HT controller detected higher feedback value than mA set value error range
84	HU Warning Level	Anode heat unit exceeds 75% of its capacity.
85	Tube Overload	Exposure condition is over the limit of selected x-ray tube rating
113	Maximum kV	Entered kV value higher than maximum allowed kV value
112	Minimum kV	Entered kV value lower than minimum allowed kV value
115	Maximum mA	Entered higher mA value than allowed maximum mA
114	Minimum mA	Entered lower mA value than allowed minimum mA
117	Maximum Exp. Time	Entered longer exposure time value than allowed maximum exposure time
116	Minimum Exp. Time	Entered shorter exposure time value than allowed minimum exposure time
119	Maximum Density	Entered higher density value than allowed maximum density

118	<b>Minimum Density</b>	Entered lower density value than allowed minimum density
129	<b>Maximum mAs</b>	Entered higher mAs value than allowed maximum mA
128	<b>Minimum mAs</b>	Entered lower mAs value than allowed minimum mA
130	<b>Max. Output Rating</b>	Entered higher output rating value than allowed Nominal Output Rating
131	<b>AEC is Unavailable</b>	Selected AEC feature when AEC function is not set
132	<b>USB RX FIFO Overflow</b>	During communication between Remote Diagnosis Software and Console, USB receiving buffer is overflowed
133	<b>USB Connection Fail</b>	Communication to Remote Diagnosis Software is disconnected
104	<b>HT CRC Fail</b>	CRC fail of communication data from Console to HT controller
134	<b>USB CRC Fail</b>	CRC fail of communication data between Console with Remote Diagnosis Software
120	<b>CONSOLE RX Overflow</b>	During communication between HT controller and Console, Console's receiving buffer is overflowed.
135	<b>USB TX Fail</b>	Failure of USB data transmission from Console to Remote Diagnosis Software
102	<b>NVSRAM Initialize</b>	Initializing NVSRAM in HT controller
121	<b>CONSOLE TX Overflow</b>	During communication between HT controller and console, console transmission buffer is overflowed

### 3.3 CPI

This section explains about the direct integration process between **VXvue** and the **CPI** generator model.

#### Interlock Condition

Comply with the communication standard of RS-232.

#### Integrated Model

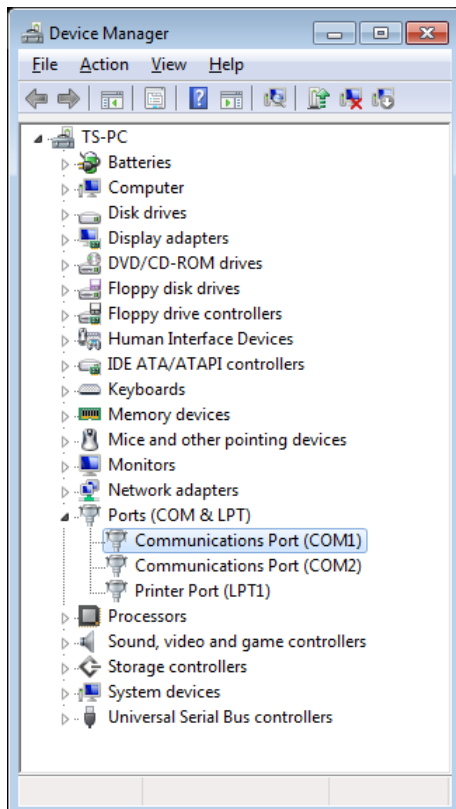
- CMP 200 DR, INDICO 100
- Millenia



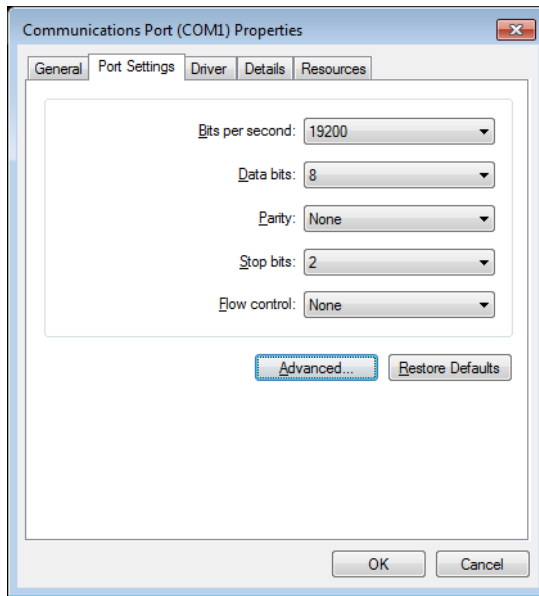
- Some models of the **CPI** generator cannot be integrated with VXvue depending on their specifications.

#### 3.3.1 How to Set Port from PC

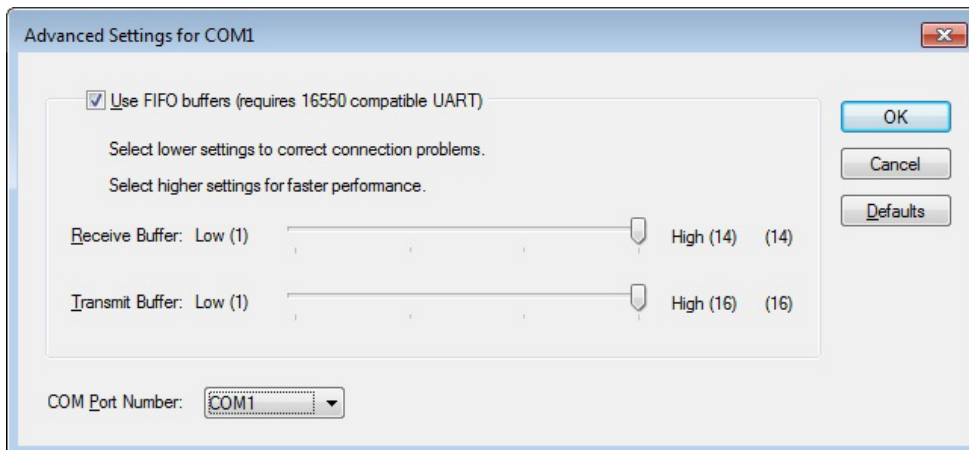
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - **Control Panel** → **System and Security** → Select **System** → **Device Manager**
  - **Start** → Input **Device Manager** to **Windows Search**
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



4 Click the **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when making settings about the generator in **VXSetup**.

### 3.3.2 How to Set CPI Generator in VXSetup and VXvue

#### VXSetup

1 Run VXSetup and click the **Individual Setting** button.

2 Set each item of the **Generator** menu as follows;

- **Product:** CPI
- **Model:** CMP 200 DR, INDICO 100
- **Port:** COM port number configured from the PC. (Refer to < 3.3.1 How to Set Port from PC>.)
- **Stop Bit:** Stops bit number according to the connecting method of generator. (1 or 2)

- **Mode with**

- **Console:** If you use the J21 port of the CPI CMP 200 DR generator and the J2 port of the CPI INDICO 100 generator to synchronize data with the PC while using the membrane console.
- **Mini Box:** When connecting interface box and PC without using J21 port and J2 port at the same time.



- If the CPI INDICO 100 generator is set to **RF** mode, you must select the **RF** option under **Mode with**.

3 Click the **Echo** button to check the connecting status.

4 Click the **OK** button to save the settings.



- Check if the PC and generator are connected with a cable (RS-232c) properly before setting items related to the generator in VXSetup.

## VXvue



- The **CPI** generator is integrated directly with VXvue.
- Refer to <**3.1.1 Generator Interlock setting**> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.
- The generator supports up to 6(1~6) receptors.



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

## 3.3.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from **Setting** mode → **Procedure** → Procedure **Manager** panel in **VXvue**. Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Density / Focal Spot / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Procedure Manager

Category

Procedure

Stitch Protocol

Step

Bodypart/Projection

Show All

General

Generator

Collimator

Equipment

Search

Setting

Target E.I.

Select All

Copy From

Insert

Edit

Delete

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...	Focal Spot	
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0	Current	
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0	Current	
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0	Current	
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0	Current	
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0	Current	
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0	Current	

Setting

Target E.I.

Select All

Copy From

Insert

Edit

Delete



- If '**Generator**' is selected among the buttons at the top of the **Step** tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select **Current** in the **Focal Spot** column, focal spot is automatically adjusted according to the **mA** range set in the generator. If you select Small or Large, focal spot is selected when step is selected regardless of the configured mA value.
- If you select a value other than **Current** in **Dose Mode**, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.3.4 How to Use CPI Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check communication status between the generator and PC. (Ex. port settings, etc.)

- You can perform the following functions.
  - Using AEC function
  - Adjusting kVp and mAs
  - Adjusting mA and ms instead of mAs

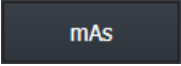
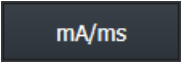






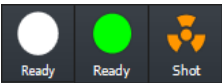

Items	Image
2 points	
3 points	
AEC (Backup mode : mAs)	



- The **CPI** generator supports **AEC Backup** mode which sets the maximum limitation of **ms** and **mAs** while taking X-rays under the **AEC** mode.
  - Fixed - The maximum limitation of ms and mAs is set automatically under the AEC mode automatically (Unable to set by a user.)
  - mAs - The maximum limitation of mAs for shooting X-ray under the AEC mode is set.
  - ms - The maximum limitation of ms for shooting X-ray under the AEC mode is set.
- Contact the manufacturer of CPI generator for the information of setting the **AEC Backup** mode.

## Icons

The icons disabled in UI are not supported ones when the viewer is integrated with **CPI** generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> , <b>ms</b> can be adjusted.
	<b>AEC</b>	Enable to apply AEC functions.
	<b>AEC Field</b> (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>• Default setting: Center</li> <li>• Enable to select multiple AEC fields.</li> </ul>
	<b>Density</b>	Enable to adjust the density of AEC.
	<b>Focal Spot Size</b> (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>Reset</b>	The <b>Reset</b> icon is activated and an error message is indicated when a soluble error occurs by resetting the system. Click the icon at this time to start reset.
	<b>Heat Units (Anode)</b>	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• <math>0 &lt; HU \leq 50</math>: Green</li> <li>• <math>50 &lt; HU \leq 80</math>: Yellow</li> <li>• <math>80 &lt; HU</math>: Red</li> </ul>
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>• <b>Ready</b> (White) - Standby</li> <li>• <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li> <li>• <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

## Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.3.5 Error and Warning Messages of CPI Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

#### Error Message (CPI CMP200 DR)

Code	Error Message
1	Generator CPU EPROM checksum error 1
2	Generator CPU EEPROM data checksum error 1
3	Generator CPU NVRAM error 1
4	Generator CPU Real Time Clock error
5	Main Contactor error 1
6	Rotor Fault
7	Filament Fault
8	kV / mA Fault(previously known as Beam Fault)
9	Power Supply Not Ready
10	No KV during exposure
11	mA during exposure too high
12	mA during exposure too low
13	Manually Terminated Exposure
14	AEC Back - up Timer - Exposure Terminated
15	AEC MAS Exceeded - Exposure Terminated
16	Tomo Back - up Timer - Exposure Terminated
17	Uncalibrated Exposure Parameter
18	Preparation Time - out Error
19	Anode Heat Limit
20	Thermal Switch Interlock #1 Error
21	Thermal Switch Interlock #2 Error
22	Door Interlock Error
23	Collimator Interlock Error
24	Cassette Interlock Error
25	II Safety Interlock Error
26	Spare Input Interlock Error
27	Receptor Time - out Error - Receptor did not respond within time - out
28	Prep Input active during Initialization Phase
29	X - ray Input active during Initialization Phase
30	Fluoro Input active during Initialization Phase
31	Communication Error Remote Fluoro

32	Communication Error Console
33	Lithium Battery Low Voltage Error
34	+12VDC Error
35	-12VDC Error
36	+15VDC Error
37	-15VDC Error
38	Calibration Data Corrupt Error1
39	AEC Data Corrupt Error1
40	Fluoro Data Corrupt Error1
41	Receptor Data Corrupt Error1
42	Tube Data Corrupt Error1
43	High Voltage Error - KV detected in non x - ray state
44	Invalid Communication Message
45	Communication Message Not Supported
46	Communication Message Not Allowed
47	Fluoro Timer Limit Error
48	Focus Mismatch Error
49	Not Enabled Error
50	Generator Limit Data Corrupt Error1
51	AEC Feedback Error(No Feedback Signal Detected)
52	High Small Focus Filament Current Error in Standby
53	High Large Focus Filament Current Error in Standby
54	AEC Reference out of range
55	No Fields Selected in AEC mode
56	No Tube Programmed
57	AEC Stop signal in wrong state
58	Console Back - Up Timer
59	Housing Heat Limit Exceeded2
60	High KV Error
61	Low KV Error
62	EXP_SW signal active in standby state
63	Factory Defaults Enabled
64	No Exposure Release2
65	Tomo Device Error2
66	No Sync Pulse Input
67	Power Supply Duty Cycle Limit
70	Software Key Error
71	DAP Dose Overflow
72	DAP Device Error
73	DAP Data Error
74	Inverter 1 Error

75	Inverter 2 Error
76	Inverter 3 Error
77	Resonant Circuit Error
78	Bucky 1 Interlock
79	Bucky 2 Interlock
80	Interlock 1
81	Interlock 2
82	Overvoltage
83	Anode Overcurrent
84	Cathode Overcurrent
85	Main Rotor Fault
86	Shift Rotor Fault
87	Temperature Sensor Fault
88	Power Supply Temperature Exceeds maximum
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
103	Calibration Error - Manually Terminated
104	Calibration Error - No mA
105	Calibration Error - Minimum mA not calibrated
150	Table Comm Error
151	Bucky Orientation Error
152	Table Error
153	Parameter Limit
154	Table Emergency Stop
160	Stand Not Ready

#### Warning Message (CPI CMP200 DR)

Code	Warning Message
200	Anode Warning Level Exceeded
201	Fluoro Timer Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit

211	Calibration Limit, Selected Parameter not Calibrated
212	Generator AEC Density Limit
213	Invalid Communication Parameter
214	Housing Heat Warning2
215	CT Termination Input Wrong State2
216	Deselect Tomo Table2
217	Select Tomo Angle2
218	Invalid Tomo Angle2
219	Generator PPS Limit
220	Generator Power Supply Duty Cycle Warning
221	Generator Joule Limit
230	DAP Not Ready
231	DAP Rate Warning
232	DAP Accum Warning

**Error Message (CPI INDICO 100)**

Code	Error Message
1	Generator CPU EPROM checksum error 1
2	Generator CPU EEPROM data checksum error 1
3	Generator CPU NVRAM error 1
4	Generator CPU Real Time Clock error
5	Main Contactor error 1
6	Rotor Fault
7	Filament Fault
8	kV / mA Fault(previously known as Beam Fault)
9	Power Supply Not Ready
10	No KV during exposure
11	mA during exposure too high
12	mA during exposure too low
13	Manually Terminated Exposure
14	AEC Back - up Timer - Exposure Terminated
15	AEC MAS Exceeded - Exposure Terminated
16	Tomo Back - up Timer - Exposure Terminated
17	Uncalibrated Exposure Parameter
18	Preparation Time - out Error
19	Anode Heat Limit
20	Thermal Switch Interlock #1 Error
21	Thermal Switch Interlock #2 Error
22	Door Interlock Error
23	Collimator Interlock Error
24	Cassette Interlock Error

25	II Safety Interlock Error
26	Spare Input Interlock Error
27	Receptor Time - out Error - Receptor did not respond within time - out
28	Prep Input active during Initialization Phase
29	X - ray Input active during Initialization Phase
30	Fluoro Input active during Initialization Phase
31	Communication Error Remote Fluoro
32	Communication Error Console
33	Lithium Battery Low Voltage Error
34	+12VDC Error
35	-12VDC Error
36	+15VDC Error
37	-15VDC Error
38	Calibration Data Corrupt Error1
39	AEC Data Corrupt Error1
40	Fluoro Data Corrupt Error1
41	Receptor Data Corrupt Error1
42	Tube Data Corrupt Error1
43	High Voltage Error - KV detected in non x - ray state
44	Invalid Communication Message
45	Communication Message Not Supported
46	Communication Message Not Allowed
47	Fluoro Timer Limit Error
48	Focus Mismatch Error
49	Not Enabled Error
50	Generator Limit Data Corrupt Error1
51	AEC Feedback Error(No Feedback Signal Detected)
52	High Small Focus Filament Current Error in Standby
53	High Large Focus Filament Current Error in Standby
54	AEC Reference out of range
55	No Fields Selected in AEC mode
56	No Tube Programmed
57	AEC Stop signal in wrong state
58	Console Back - Up Timer
59	Housing Heat Limit Exceeded2
60	High KV Error
61	Low KV Error
62	EXP_SW signal active in standby state
63	Factory Defaults Enabled
64	No Exposure Release2
65	Tomo Device Error2

66	No Sync Pulse Input
67	Power Supply Duty Cycle Limit
70	Software Key Error
71	DAP Dose Overflow
72	DAP Device Error
73	DAP Data Error
74	Table Communication Error
75	Table Emergency Stop
76	High Micro Focus Filament Current
77	ADR Cable INTERlock
78	ADR Error
79	Mask Abort Error
80	Field Orientation Error
81	No Cine Tube Selected
82	Cine Data Error
83	Air Kerma Dose Overflow
84	Air Kerma Data Error
85	Table Error
86	Digital System Comms Error
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
103	Calibration Error - Manually Terminated
104	Calibration Error - No mA
105	Calibration Error - Minimum mA not calibrated

#### Warning Message (CPI INDICO100)

Code	Warning Message
200	Anode Warning Level Exceeded
201	Fluoro Timer Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit
211	Calibration Limit, Selected Parameter not Calibrated
212	Generator AEC Density Limit

213	Invalid Communication Parameter
214	Housing Heat Warning2
215	CT Termination Input Wrong State2
216	Deselect Tomo Table2
217	Select Tomo Angle2
218	Invalid Tomo Angle2
219	Generator PPS Limit
220	Generator Power Supply Duty Cycle Warning
221	DAP Device Not Ready
222	DAP Rate Warning Level Exceeded
223	DAP Accumulated Warning Level Exceeded
224	Parameter Limit
225	Fluoro Focus Auto Changeover (default focus damaged)
226	Air Kerma Rate Warning
227	Air Kerma Accumulated Warning

### 3.4 Sedecal

This section explains about the integration process between **VXvue** and the general generator and mobile models (DRAGON) of **Sedecal**.



- Refer to <3.4Sedecal\_WM> for the use way of **Sedecal\_WM** console software.

#### Interlock Condition

Comply with the communication standard of RS-232.

#### Integrated Model

- SHF Series / DRAGON / Mobile Battery X-ray Generator

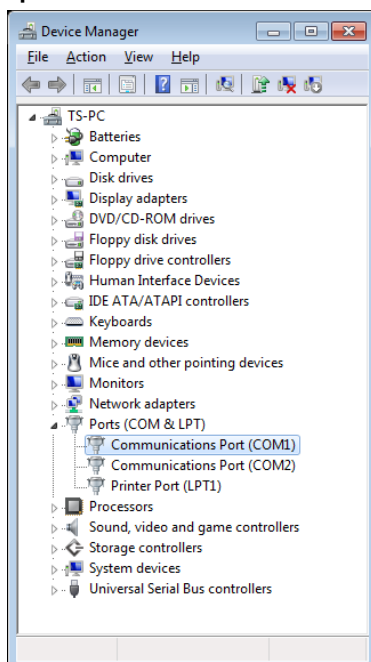


- Some models of the **Sedecal** generator cannot be integrated with **VXvue** depending on their specifications.

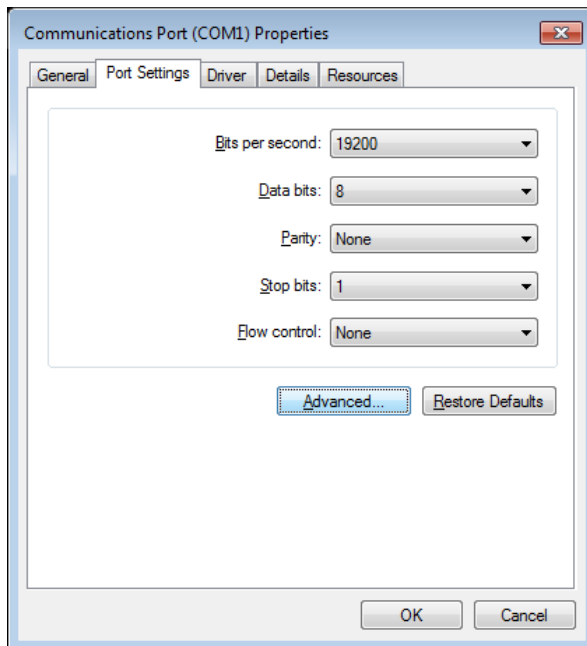
Mapped VXvue ver.	Controller ver.	Generator SW (console) ver.
V1.0.1.4	V5R8.9	V7R1b87

#### 3.4.1 How to Set Port from PC

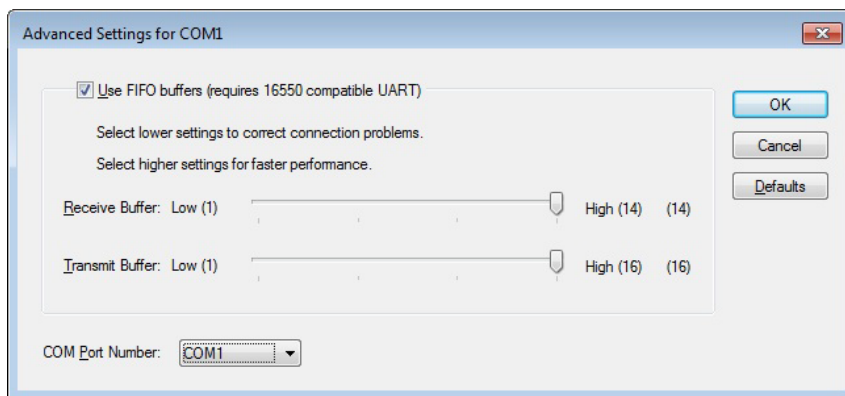
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and click Communications **Port** menu with the right mouse button. Then click **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port Number** to be used.

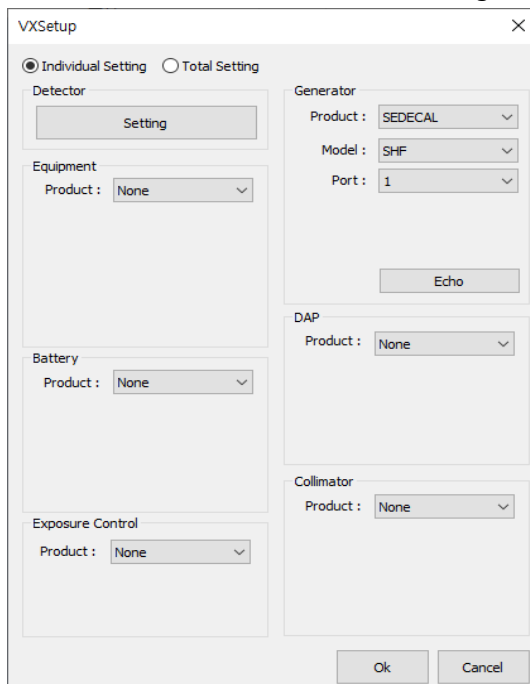


- Input or choose the configured COM port number when setting the generator in VXSetup.

### 3.4.2 How to Set Sedecal Generator in VXSetup VXvue

#### VXSetup

- 1 Run VXSetup and click the Individual Setting button.
- 2 Set options of the Generator menu as follows.
  - Product: SEDECAL
  - Model: SHF Serise / DRAGON
  - Port: Choose the COM port number configured from PC. (Refer to <3.5.1 How to Set Port from PC>.)
- 3 Click the **Echo** button to check the connecting status.



- 4 Click the **OK** button to save the settings.



- Check if the PC and generator are connected with a cable (RS-232c) properly before setting items related to the generator in VXSetup.

**VXvue**

- The Sedecal generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.
- The generator supports up to 8 receptors.



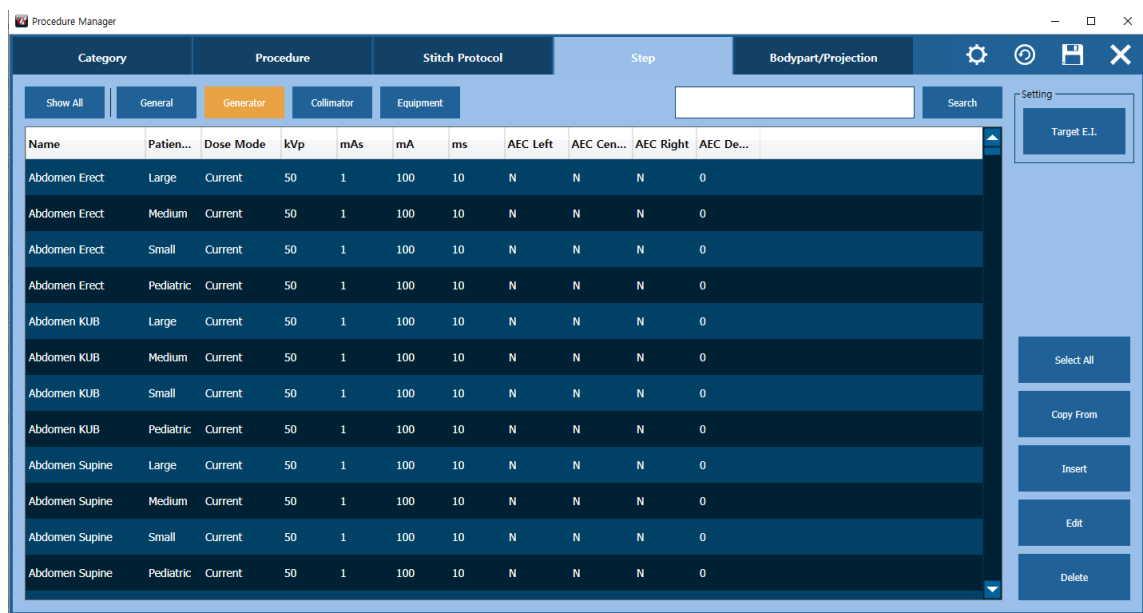
- The **Stand** and **Table** options cannot be set if the DRAGON model is integrated with **VXvue**.



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

**3.4.3 How to Set Generator in Procedure Manager in VXvue**

- Click the **Procedure Manager** button from **Setting** mode → **Procedure** → **Procedure Manager** panel in VXvue. Or, execute Procedure Manager located in the installation folder of VXvue directly.
- Choose **kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode.



- If 'Generator' is selected among the buttons at the top of the **Step** tab, only the generator-related settings are displayed.
- You cannot set the value of functions which the generator does not support.



- Since the DRAGON generator does not support **AEC** function, the values cannot be set if the DRAGON generator is integrated with VXvue.

### 3.4.4 How to Use Sedecal Generator in VXvue

The following UIs (User Interface) are displayed at the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)



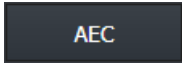



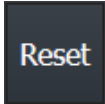

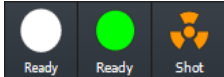
- You can perform the following functions.
  - Using AEC function
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
AEC	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **Sedecal** generator.



Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> , <b>ms</b> can be adjusted.
	AEC*	Enable to apply AEC functions. ▪ *Not applicable for the DRAGON model
	AEC Field* (Left / Center / Right)	Select an AEC field to use. ▪ Default setting: <b>Center</b> ▪ Enable to select multiple AEC fields. ▪ *Not applicable for the DRAGON model
	Density*	Enable to adjust the density of AEC. ▪ *Not applicable for the DRAGON model
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. ▪ Click this icon at this time to start reset.
	Heat Units (Anode)	The color of icon changes according to the heat units. ▪ 0<HU≤50: Green ▪ 50<HU≤80: Yellow ▪ 80<HU: Red
	X-ray Status	The icons and their color are changed depending on the status of generator. ▪ <b>Ready</b> (White) - Standby ▪ <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1 <sup>st</sup> level switch (Ready) of the generator. ▪ <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2 <sup>nd</sup> level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### Supported functions of DRAGON

The following table describes functions supported only when the DRAGON generator is integrated with **VXvue**.

Icon	Name	Description
	<b>Exposure Indicator</b>	<p>Indicates whether the X-ray can be exposed or not.</p> <ul style="list-style-type: none"> <li>• It is possible in the following cases: <ul style="list-style-type: none"> <li>▫ In the Exposure tab,</li> <li>▫ The screen is not maximized.</li> <li>▫ Connecting DR and registering the study.</li> <li>▫ The CR mode is activated.</li> </ul> </li> </ul>
	<b>Disconnect/Reconnect Device</b>	Disconnecting or reconnecting <b>VXvue</b> with DAP.

### Error Message

- The general error and warning messages are indicated as slides.
  - Red color : error / Yellow color : warning
- The additional message box is displayed if critical errors occur as below.
  - Low battery capacity
  - Power Save mode
  - The power is off by using a key of the generator. (ER033)
  - Communication error with the generator (ER033)



- Refer to the protocol document of **Sedecal** for the detailed information about handling error messages.

### 3.4.5 Error and Warning Messages of Sedecal Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

### SHF Series

- Recoverable error: The generator is reset through ER00 code, 1 second after the error occurred.
- Unrecoverable error: The generator is rebooted.

Error Code	Message
E01	POWER UP ROUTINE NOT OK
E02	NA
E03	ALL WORSTATIONS ARE UNCONFIGURED
E04	PREP SIGNAL NOT SELECTED
E05	FLUORO SIGNAL ACTIVATED
E06	PREP OR EXP.SIGNALS ACTIVATED
E07	WRONG DATA TUBE CONFIG.
E08	WRONG DATA TUBE CONFIG
E09	ARCING OR IGBT FAULT
E10	WRONG DATA CALIBRATION
E11	NO VOLTAGES IN CAP BANK
E12	INCORRECT FIL. CURRENT
E13	NO KVP DURING EXPOSURE
E14	EXPOSURE SIGNAL ACTIVATED
E15	NO FIL. CURRENT DETECTED
E16	WRONG KVP OR MA VALUE.
E17	NO COMM. CABINET/CONSOLE
E18	WRONG PREP SIGNAL
E19	WRONG FILAMENT CURRENT
E20	WRONG EXPOSURE SIGNAL
E21	WRONG TUBE 1 SELECTION
E22	WRONG TUBE 2 SELECTION
E23	CALIBRATION DATA NOT STORED
E24	WRONG BUCKY EXP.SIGNAL
E25	NA
E26	NA
E27	CONSOLE EPROM BAD CHECKSUM
E28 to E50	NA
E51	A CHEKSUM FAILURE OF THE ROM HAS BEEN DETECTED
E52	A FAILURE OF THE RAM HAS BEEN DETECTED
E53	INSUFFICIENT DC BUS VOLTAGE AT LOW LEVEL VOLTAGE (220 VAC MAINS)
E54	INSUFFICIENT DC BUS VOLTAGE AL HIGH LEVEL VOLTAGE (480 VAC MAINS)
E55	EXCESSIVE DC BUS VOLTAGE AT HIGH LEVEL VOLTAGE (480 VAC MAINS)
E56	NA
E57	NA
E58	EXCESSIVE CURRENT IN MAIN WINDING DURING ACCELERATION TO 3300RPM
E59	EXCESSIVE CURRENT IN AUXILIAR WINDING DURING ACCELERATION TO 3300RPM
E60	INSUFFICIENT CURRENT IN AUXILIAR WINDING DURING ACCELERATION TO 3300RPM
E61	INSUFFICIENT CURRENT IN MAIN WINDING DURING ACCELERATION TO 3300RPM
E62	EXCESSIVE CURRENT IN MAIN WINDING DURING ACCELERATION TO 10000RPM

<b>E63</b>	EXCESSIVE CURRENT IN AUXILIAR WINDING DURING ACCELERATION TO 10000RPM
<b>E64</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING DURING ACCELERATION TO 10000RPM
<b>E65</b>	INSUFFICIENT CURRENT IN MAIN WINDING DURING ACCELERATION TO 10000RPM
<b>E66</b>	EXCESSIVE CURRENT IN MAIN WINDING RUNNING AT 3300RPM
<b>E67</b>	EXCESSIVE CURRENT IN AUXILIAR WINDING RUNNING AT 3300RPM
<b>E68</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING RUNNING AT 3300RPM
<b>E69</b>	INSUFFICIENT CURRENT IN MAIN WINDING RUNNING AT 3300RPM
<b>E70</b>	EXCESSIVE CURRENT IN MAIN WINDING RUNNING AT 10000RPM
<b>E71</b>	EXCESSIVE CURRENT IN AUXILIAR WINDING RUNNING AT 10000RPM
<b>E72</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING RUNNING AT 10000RPM
<b>E73</b>	INSUFFICIENT CURRENT IN MAIN WINDING RUNNING AT 10000RPM
<b>E74</b>	EXCESSIVE CURRENT IN MAIN WINDING BRAKING AT 3300RPM
<b>E75</b>	EXCESSIVE CURRENT IN AUXILIAR WINDING BRAKING AT 3300RPM
<b>E76</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING BRAKING AT 3300RPM
<b>E77</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING BRAKING AT 3300RPM
<b>E78</b>	EXCESSIVE CURRENT IN MAIN WINDING BRAKING AT 10000RPM
<b>E79</b>	EXCESSIVE CURRENT IN AUXILIAR WINDING BRAKING AT 10000RPM
<b>E80</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING BRAKING AT 10000RPM
<b>E81</b>	INSUFFICIENT CURRENT IN AUXILIAR WINDING BRAKING AT 10000RPM
<b>E82</b>	THE X-RAY TUBE HAS NOT BEEN PROPERLY SELECTED
<b>E83</b>	EXCESSIVE CURRENT IN DC BRAKE
<b>E84</b>	SWITCH 3243SW4-6 IS NOT IN ON POSITION
<b>E85</b>	SWITCH 3243SW4-6 IS NOT IN ON POSITION
<b>E86</b>	SWITCH 3243SW4-6 IS NOT IN ON POSITION
<b>E87</b>	INSUFFICIENT CURRENT IN COMMON WIRE DURING ACCELERATION UP TO 3300RPM
<b>E88</b>	INSUFFICIENT CURRENT IN COMMON WIRE RUNNING TO 3300RPM
<b>E89</b>	INSUFFICIENT CURRENT IN COMMON WIRE DURING ACCELERATION TO 10000RPM
<b>E90</b>	INSUFFICIENT CURRENT IN COMMON WIRE RUNNING TO 10000RPM
<b>E91</b>	INCORRECT MEASURE AT IPRINC (CH2)
<b>E92</b>	INCORRECT MEASURE AT IAUX (CH3)
<b>E93</b>	INCORRECT MEASURE AT ICOM (CH4)
<b>E99</b>	UNRECOGNIZED MESSAGE

### 3.5 Sedecal\_WM

**Sedecal\_WM** generator can be integrated with **VXvue** by software-driven way, communicated through the console software of **Sedecal\_WM** generator and **VXvue**. To make the integration process, install the console software of **Sedecal\_WM** generator first, and check if it runs normally.

#### Interlock Condition

- The Sedecal generator complies with the communication standard of RS-232.
- Sedecal\_WM generator is communicated with VXvue through its console software.



- **Sedecal\_WM** supports the integration function for **VXvue for Vet**. It does not support **VXvue for Human** and **VXvue for Equine**.
- Some **Sedecal** generator models cannot be integrated with **VXvue** depending on whether they support the **Sedecal\_WM** software or not.

#### Preparing for Integration

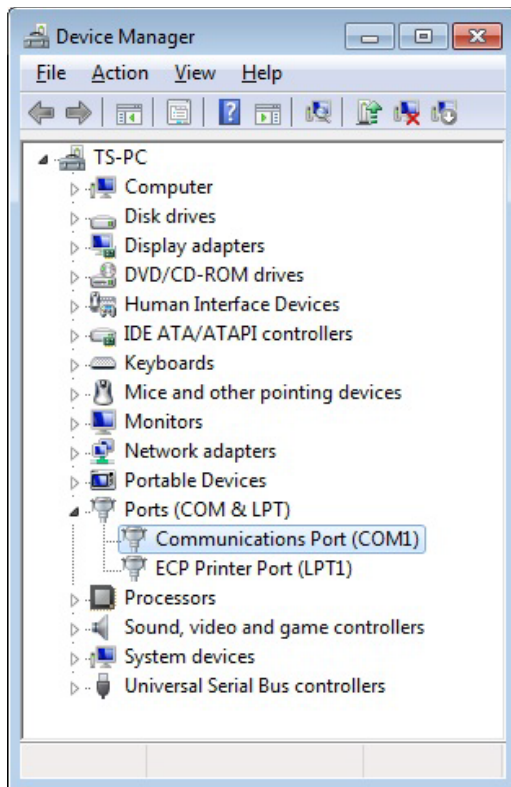
- 1 Install the **Sedecal\_WM** program (**SecedalInstaller2R1b15.exe**).
- 2 Open the **AppName.ini** file to modify the **APPNAME** item as **MAXXvue Vet** (case-sensitive).



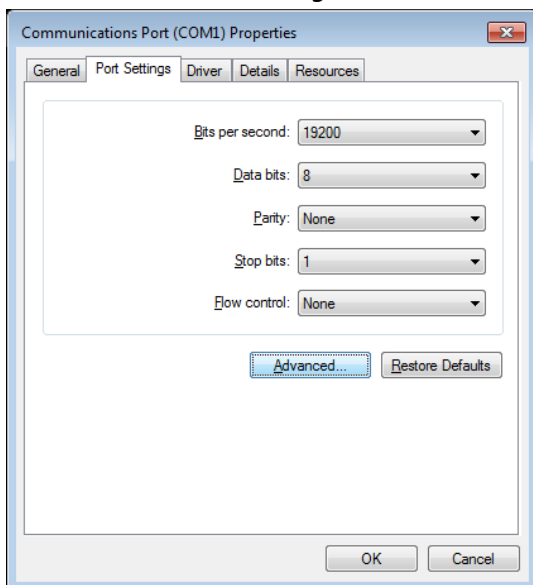
- Be sure that execution rights of the **Sedecal\_WM** program and **VXvue** should be the same. ('Administrator – Administrator' or 'User – User')

#### 3.5.1 How to Set Port from PC

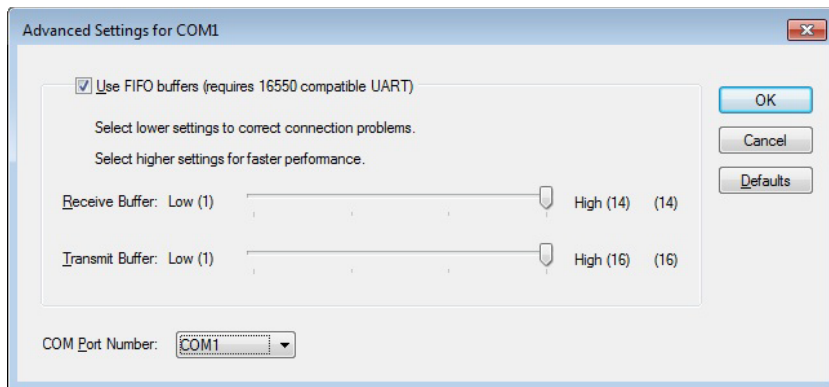
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



4 Click the **OK** button after appointing **COM Port Number** to be used.

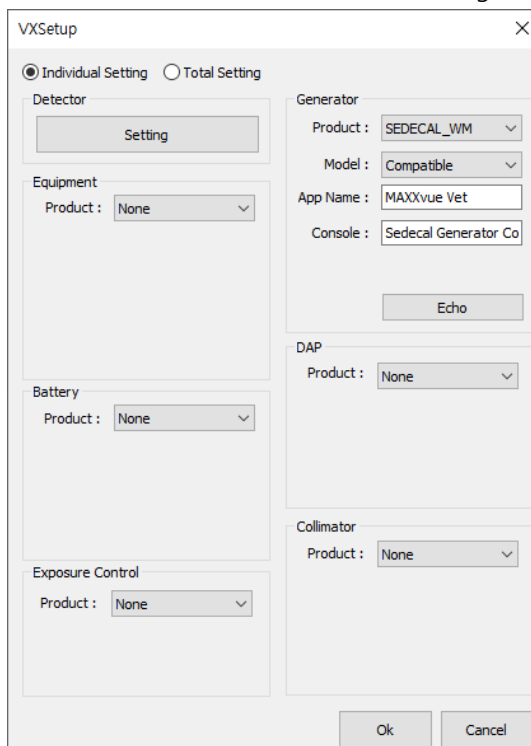


- **COM1** is designated to use for the console software of **Sedecal\_WM** generator.

### 3.5.2 How to Set Sedecal\_WM in VXSetup and VXvue

#### VXSetup

- 1 Run VXSetup and click the **Individual Setting** button.
  - Set each item of the **Generator** menu as follows:
    - **Product:** SEDECAL WM
    - **Mode:** Compatible
    - **App Name:** MAXXvue.Vet
    - **Console:** Sedecal Generator Console
- 2 Click the **Echo** button to check the connecting status.



3 Click the **OK** button to save the settings.



- Be sure to check the following things before setting **Sedecal\_WM** in VXSetup.
  - Connect the program to dual monitors.
  - Check if the Sedecal\_WM program is running.
  - Connect the PC and generator with a RS-232c cable.

## VXvue



- The Sedecal\_WM generator is integrated directly with VXvue and Sedecal\_WM program.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

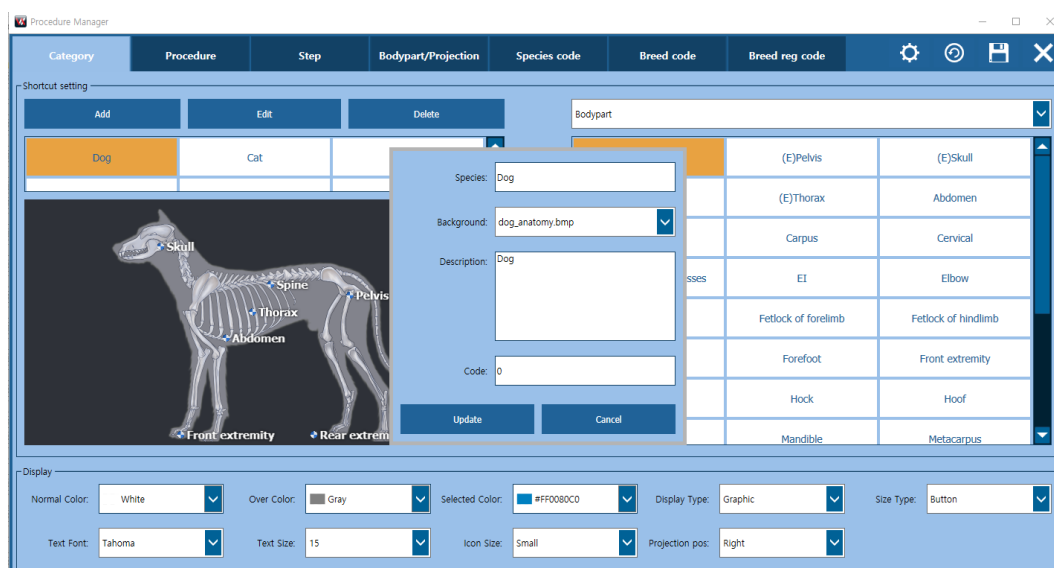
- Yo
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

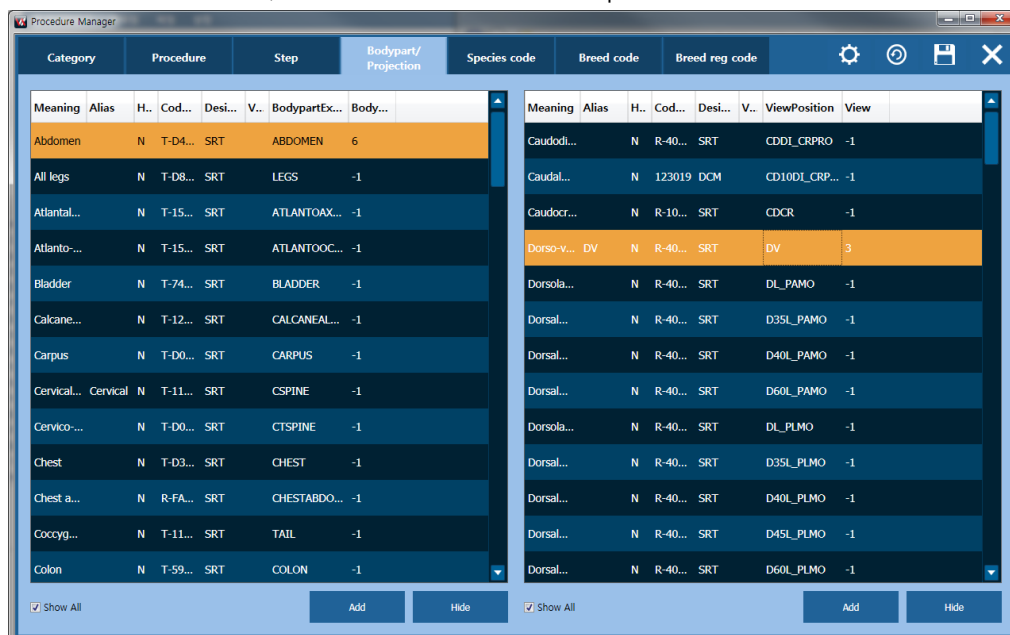
### 3.5.3 How to Set the Sedecal\_WM code in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose the items to be edited in the **Category** tab and Click the **Edit** button. After that, input the relevant codes as follows.



Category	Code
Dog	1
Cat	2
Exotics	3

- Choose columns of **BodyArea / View** from the **Bodypart/Projection** tab where the items to be edited are included. After that, double click the column to input the relevant code as follows:



### Dog / Cat

Bodypart	Projection	Body Area	View	Side
Skull	LAT	1	1	0

	VD	1	2	0
	DV	1	3	0
Rear Extremity	LAT	2	1	0
	VD	2	2	0
	DV	2	3	0
Front Extremity	LAT	3	1	0
	VD	3	2	0
	DV	3	3	0
Thorax	LAT	4	1	0
	VD	4	2	0
	DV	4	3	0
Spine	LAT	5	1	0
	VD	5	2	0
	DV	5	3	0
Abdomen	LAT	6	1	0
	VD	6	2	0
	DV	6	3	0
Pelvis	LAT	7	1	0
	VD	7	2	0
	DV	7	3	0

#### Exotics

Bodypart	Projection	Body Area	View	Side
Turtle	Turtle	1	1	0
Bird	Bird LAT	2	1	0
Bird	Bird VD	2	2	0
Snake	Snake	3	1	0
Lizard	Lizard	4	1	0
Rodent	Rodent	5	1	0

#### Check the Integration Status

Choose **Step** or **Category** from the console software of **Sedecal\_WM** generator, and check if the same menu is applied to **VXvue** simultaneously.

- Conversely, the integration is processed successfully if the **Step** or **Category** selected in **VXvue** is applied to the console software of **Sedecal\_WM** generator at the same time.

### 3.5.4 How to Use Sedecal\_WM in VXvue

The following UIs are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.






- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You cannot adjust **kVp**, **mAs**, **ms**, and **mA** (It is available only with the **Sedecal WM** program.)

70	kVp	▲	▼	20	mAs	▲	▼
200	mA	▲	▼	100	ms	▲	▼

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **Sedecal\_WM** generator.

Icon	Name	Description
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>▪ <b>Ready</b> (White) - Standby</li> <li>▪ <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li> <li>▪ <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>
		<ul style="list-style-type: none"> <li>• The Second Monitor function cannot be used when <b>VXvue</b> is integrated with <b>Sedecal_WM</b>.</li> </ul>
		<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>

## 3.6 Siemens

This section explains about the integration process between **VXvue** and the **Siemens** generator models.

### Interlock Condition

Comply with the communication standard of RS-232.

### Integrated Model

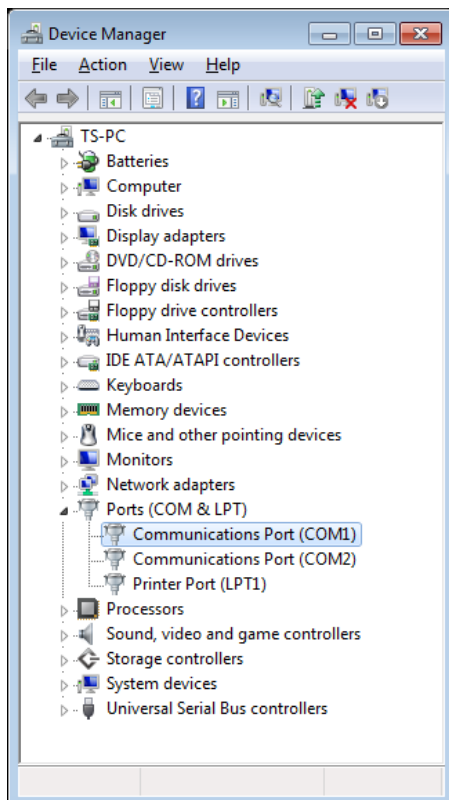
Polydoros RF



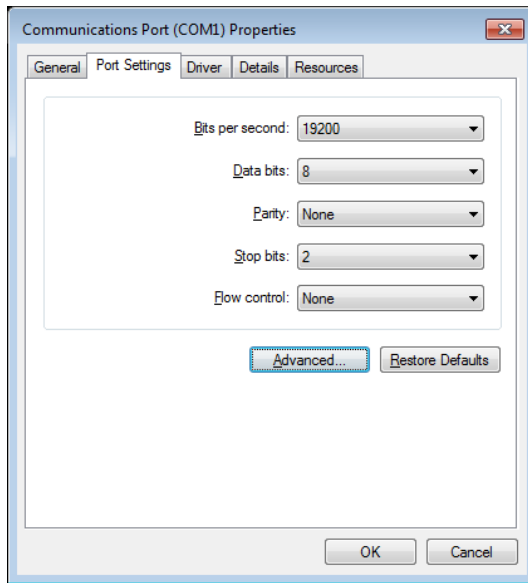
- Some models of the **Siemens** generator cannot be integrated with **VXvue** depending on their specifications.

### 3.6.1 How to Set Port from PC

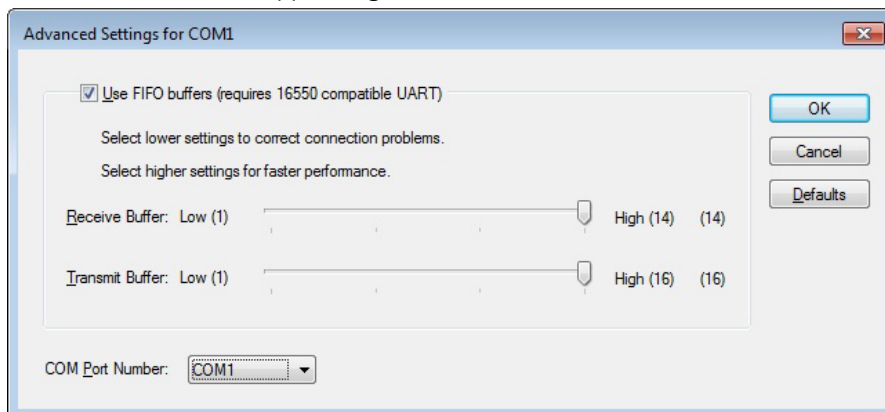
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - **Control Panel** → **System and Security** → Select **System** → **Device Manager**
  - **Start** → Input **Device Manager** to **Windows Search**
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when making settings about the generator in **VXSetup**.

### 3.6.2 How to Set Siemens Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - **Product:** SIEMENS
  - **Interface:** Version 1, Version 2
  - **Port:** COM port number configured from your PC. <Refer to (3.6.1 How to Set Port from PC).>



- There are two types of **Interface** provided by the **Siemens** generator. Contact the manufacturer of generator for the setting and checking methods.

- 3 Click the **Echo** button to check the connecting status.

- 4 Click **OK** button to save the settings.

#### VXvue



- The Siemens generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.6.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	AEC Left	AEC Cen...	AEC Right	AEC De...	Focal Spot
Abdomen Erect	Large	Current	50	1	100	N	N	N	0	Current
Abdomen Erect	Medium	Current	50	1	100	N	N	N	0	Current
Abdomen Erect	Small	Current	50	1	100	N	N	N	0	Current
Abdomen Erect	Pediatric	Current	50	1	100	N	N	N	0	Current
Abdomen KUB	Large	Current	50	1	100	N	N	N	0	Current
Abdomen KUB	Medium	Current	50	1	100	N	N	N	0	Current
Abdomen KUB	Small	Current	50	1	100	N	N	N	0	Current
Abdomen KUB	Pediatric	Current	50	1	100	N	N	N	0	Current
Abdomen Supine	Large	Current	50	1	100	N	N	N	0	Current
Abdomen Supine	Medium	Current	50	1	100	N	N	N	0	Current
Abdomen Supine	Small	Current	50	1	100	N	N	N	0	Current
Abdomen Supine	Pediatric	Current	50	1	100	N	N	N	0	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.6.4 How to Use Siemens Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You can perform the following functions.
  - Using **AEC** function
  - Adjusting **kVp** and **mAs**
  - Adjusting **kVp**, **mAs** and **ms** without using the **AEC** function.

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
AEC	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **Siemens** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/mAs	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> , <b>ms</b> can be adjusted.
	AEC	Enable to apply AEC functions.
	AEC Field (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>▫ Default setting: <b>Center</b></li> <li>▫ Enable to select multiple AEC fields.</li> </ul>
	Density	Enable to adjust the density of AEC.
	Film / Screen	Enable to set film and screen (sensitivity) of AEC. <ul style="list-style-type: none"> <li>▫ <b>Slow</b>, <b>Normal</b>, <b>Fast</b></li> </ul>
	Focal Spot Size (Small / Large)	Focal Spot Size is changed by the user manually.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message.

		<ul style="list-style-type: none"><li>Click this icon at this time to start reset.</li></ul>
	Heat Units (Anode)	<p>The color of icon changes according to the heat units.</p> <ul style="list-style-type: none"><li>0&lt;HU≤50: Green</li><li>50&lt;HU≤80: Yellow</li><li>80&lt;HU: Red</li></ul>
	X-ray Status	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"><li><b>Ready</b> (White) - Standby</li><li><b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li><li><b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li></ul>
		<ul style="list-style-type: none"><li>Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li></ul>

### 3.7 IMD

This section explains about the integration process between **VXvue** and general models of **IMD** generator.

#### Interlock Condition

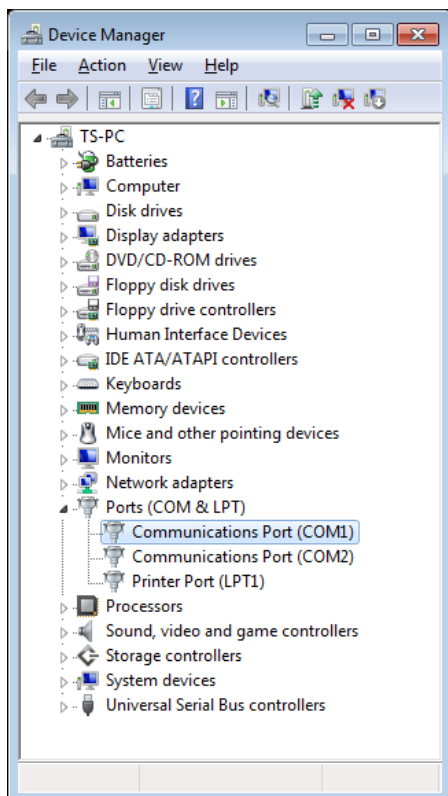
Comply with the communication standard of RS-232.

#### Integrated Model

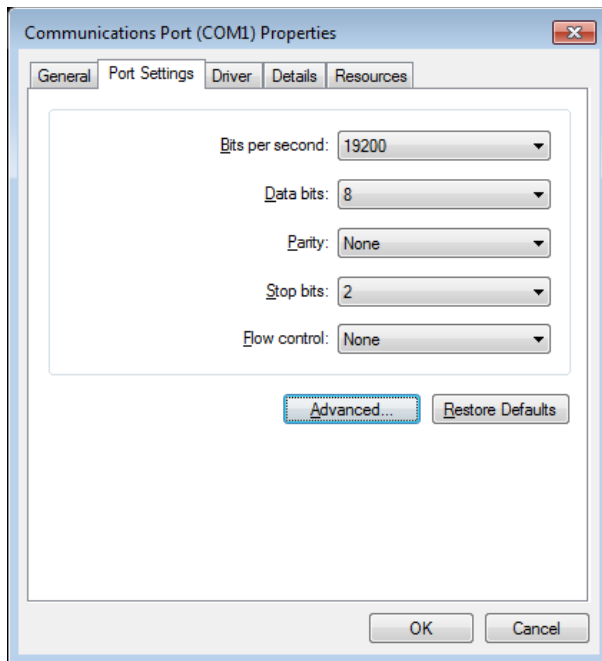
ATLAS 100-30 30kW

#### 3.7.1 How to Set Port from PC

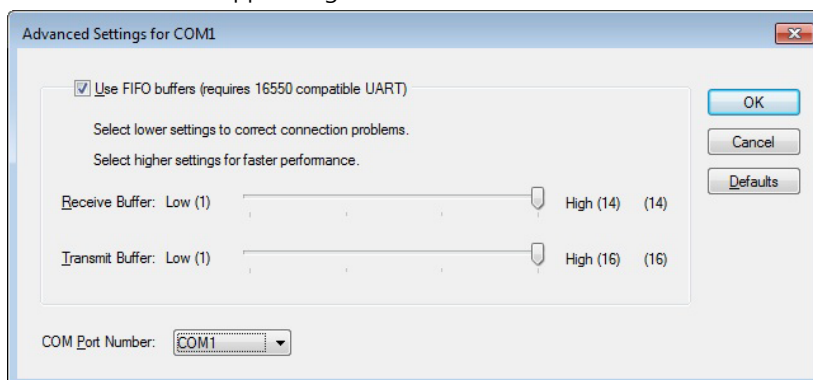
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - **Control Panel** → **System and Security** → Select **System** → **Device Manager**
  - **Start** → Input **Device Manager** to **Windows Search**
- 2 Select **Ports (COM & LPT)** and click **Communications Port** with a right mouse button. Click **Properties**.



- 3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



4 Click **OK** button after appointing **COM Port Number** to be used.

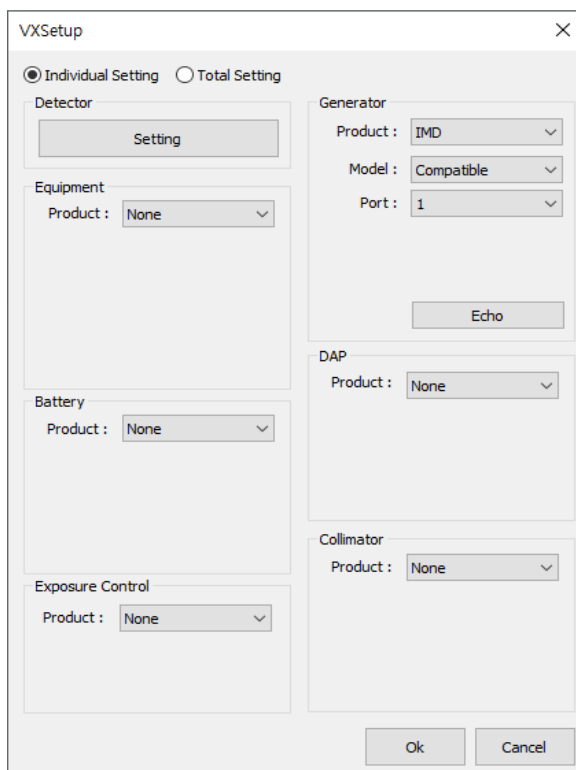


- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.7.2 How to Set IMD Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - **Product:** IMD
  - **Mode:** Compatible
  - **Port:** COM port number configured from the PC (Refer to <3.7.1 How to Set Port from PC>.)
- 3 Click the **Echo** button to check the connecting status.



4 Click **OK** button to save the settings.

### VXvue



- The IMD generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

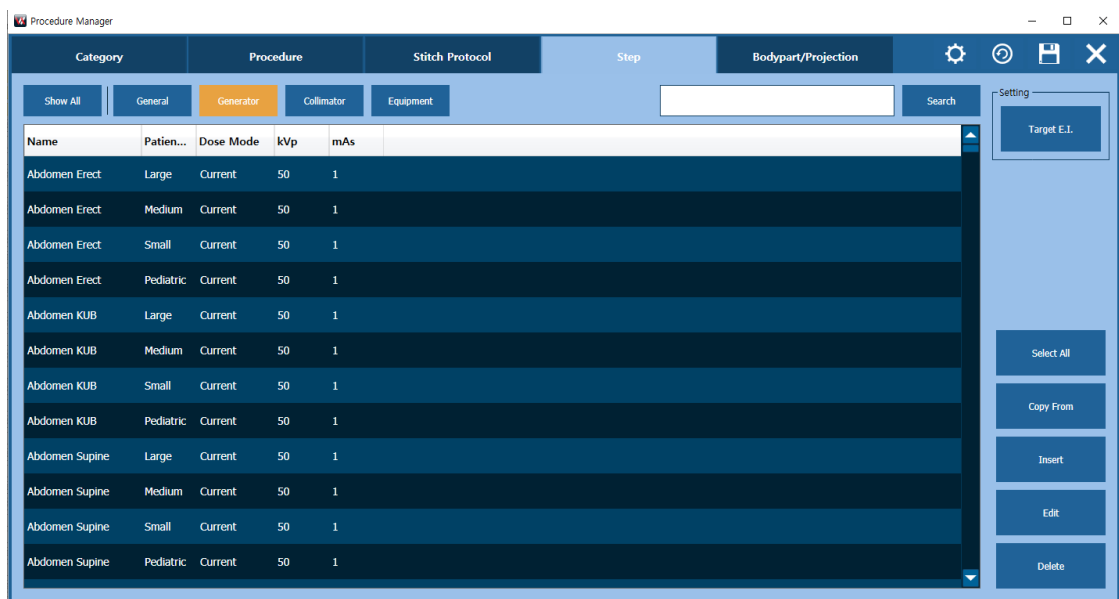
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.7.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode > Procedure > Procedure Manager in **VXvue**.  
▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.7.4 How to Use IMD Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

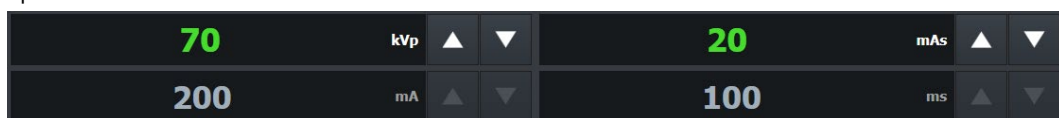
- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- The **kVp** and **mAs** values can be adjusted.




- 2 points



#### Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **IMD** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.

	<b>Focal Spot Size</b> (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"><li>▪ <b>Ready</b> (White) - Standby</li><li>▪ <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li><li>▪ <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li></ul>
	<ul style="list-style-type: none"><li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li></ul>	

## 3.8 SMAM

This section explains about the integration process between **VXvue** and the general models of **SMAM** generator.

### Interlock Condition

Comply with the communication standard of RS-232.



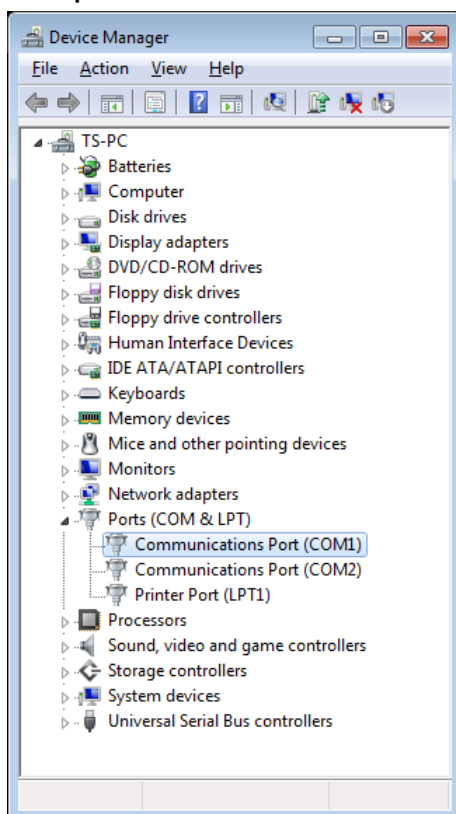
- Some models of the **SMAM** generator cannot be integrated with VXvue depending on their specifications.

### Integrated Model

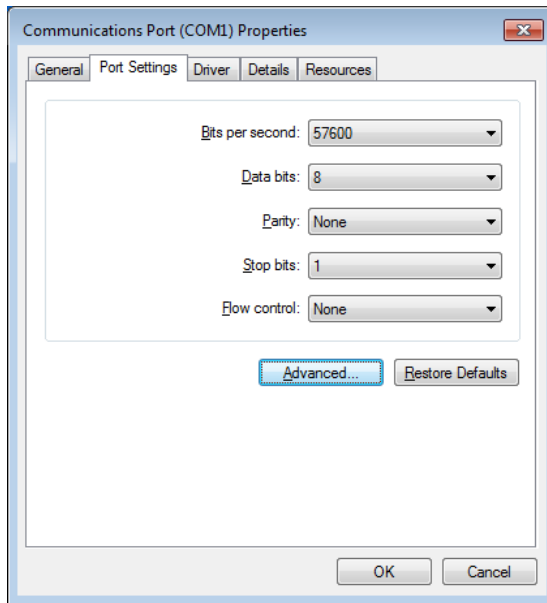
SMAM mobile 125/300 HF/AR

#### 3.8.1 How to Set Port from PC

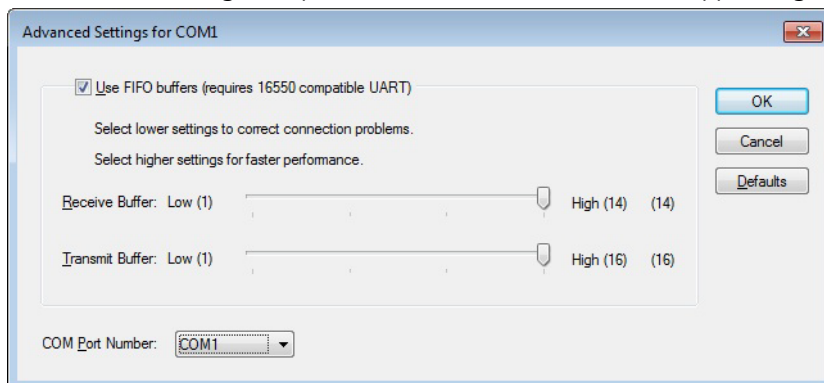
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - **Control Panel** → **System and Security** → Select **System** → **Device Manager**
  - **Start** → Input **Device Manager** to **Windows Search**
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



- 3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 If it is needed to change the port number, click **OK** button after appointing **COM Port Number**.



- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.8.2 How to Set SMAM Generator in VXSetup and VXvue

#### VXSetup

- 1 Run VXSetup and click the Individual Setting button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: SMAM
  - Model: Compatible
  - Port: Choose the COM port number configured from PC (Refer to <3.8.1 How to Set Port from PC>.)
- 3 Click the **Echo** button to check the connecting status.

4 Click **OK** button to save the settings.



- Check if the PC and generator are connected with a cable (RS-232c) properly before setting items related to the generator in VXSetup.

## VXvue



- The SMAM generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

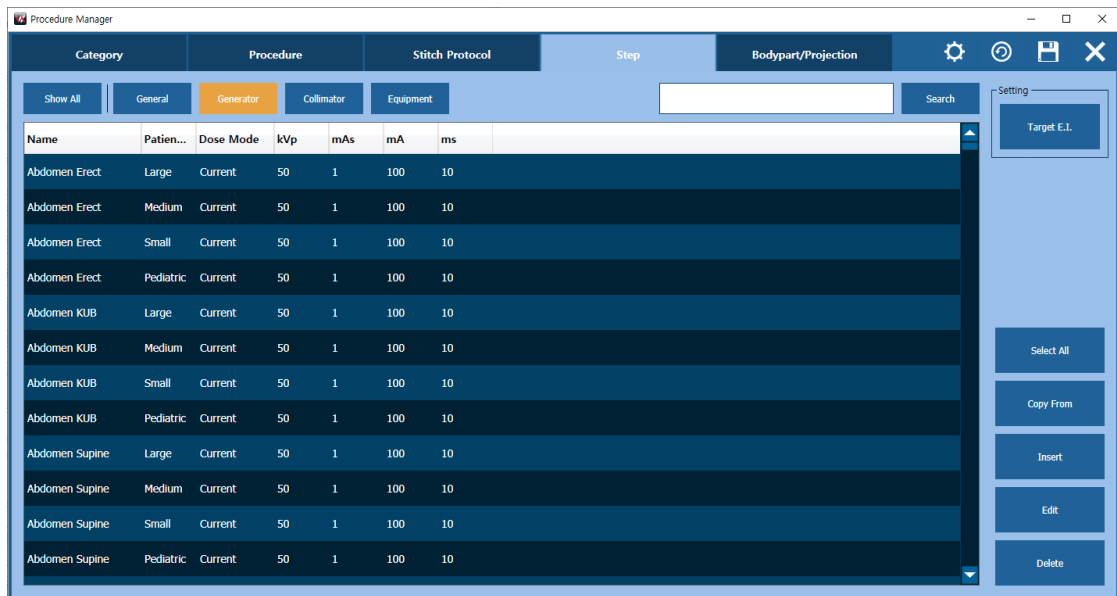
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.8.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**. Or, execute Procedure Manager located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA /ms** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.8.4 How to Use SMAM Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.




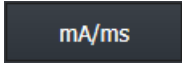



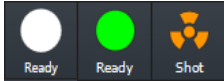

- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You can perform the following functions.
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **SMAM** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. Click this icon at this time to start reset.
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• 0&lt;HU≤50: Green</li> <li>• 50&lt;HU≤80: Yellow</li> <li>• 80&lt;HU: Red</li> </ul>
	X-ray Status	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>• <b>Ready</b> (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

### 3.8.5 Error and Warning Messages of SMAM Generator

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Reboot the generator for troubleshooting.



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

Code	Message
000	NONE
001	PROGRAM FAULT 1
100	OVL TIMEOUT
101	PRE RELEASED
102	XRAY RELEASED
103	STARTER FAIL
104	PR0 TIMEOUT
105	PR1 TIMEOUT
106	PR2 TIMEOUT
107	XR1 TIMEOUT
108	XR0 TIMEOUT
109	OVC ALARM
110	OVL ALARM
111	MAX VALUE
112	INVALID FOCUS
113	MIN CURRENT
114	MAX CURRENT
115	85% MISSED
116	WRONG CONTEXT
117	WRONG CONTEXT
118	OUT OF RANGE
119	INVALID VALUE
120	CORRELATION FAIL
121	POTTER FAIL
122	DAP NOT PRESENT
123	DAP DISABLED
124	DAP ERROR
125	DAP TIMEOUT
126	CAP CHARGING

### 3.9 Poskom (with VGI)

This section explains about the integration process between **VXvue** and the **Poskom** generator models.

#### Interlock Condition

It is linked through a separate generator interface module box provided by Poskom.



- The F/W version of the EEPROM and the CPU version of the interface box must be compatible for normal operation.
- Contact Poskom for provision and setting of VXvue compatible with EEPROM and interface box (IF BOX).

- Compatible EEPROM name: HT 51 TI FA, HT DR PC 05
- CPU version of HT control board which is EEPROM mounting part: HT101-rev03
- CPU F/W version of interface box: V02
- You need a Generator Service (GS), which is a program that uses VGI (Vieworks Generator Interface) and communicates directly with U-ARM. The communication between GS and the generator must conform to the RS-232 communication standard.

#### Integrated Models

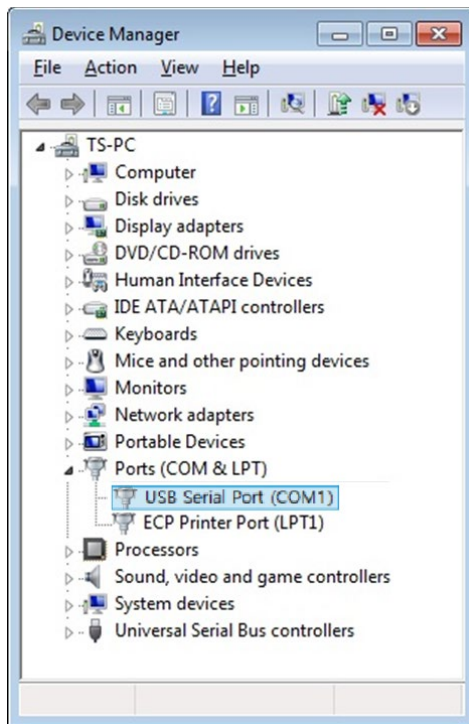
PXR-321B, PXR-401B, PXR-501B, and PXR-501T



- Some models of Poskom generator models may not be integrated with VXvue depending on their specifications and installed modules.

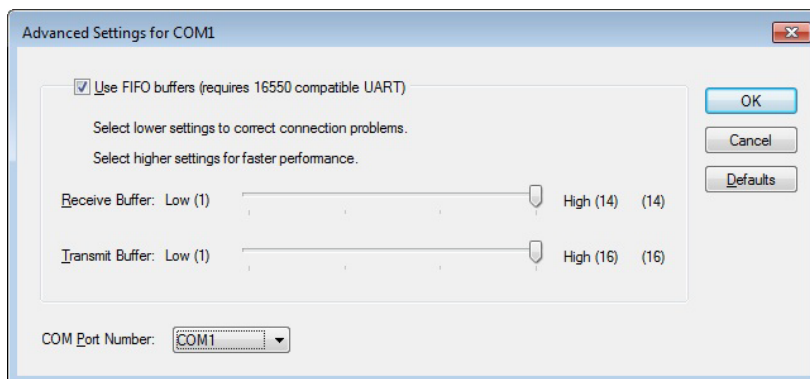
#### 3.9.1 How to Set Port from PC

- 1 Connect the generator interface module box provided by **Poskom** with PC. (USB port)
- 2 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 3 Select **Ports (COM & LPT)** and click **USB Serial Port** menu with the right mouse button. Then click **Properties**.



- In case the relevant driver (USB serial port) is not connected with **Device Manager**, it is installed by Windows Update Server automatically if the PC is on the internet.
- If it is difficult to install automatically, ask Poskom to install the driver and calibration program.

4 Set **COM Port Number** as **COM1** and click **OK** button.



- The **Poskom** generator is designated to use COM port number 1 (COM1).



- The detailed port settings (Bits per sec., stop bit, etc.) are adjusted automatically.

## Installing GS

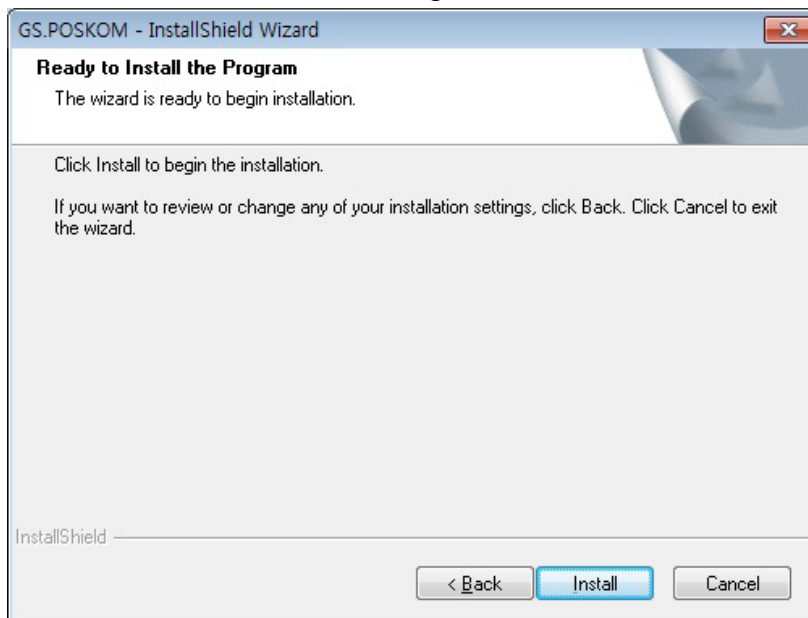


- You should install **GS.POSKOM.Setup\_3.0.0.1.exe** separately to use the Poskom generator. Contact the person in charge of Vieworks if it is needed to install the file.

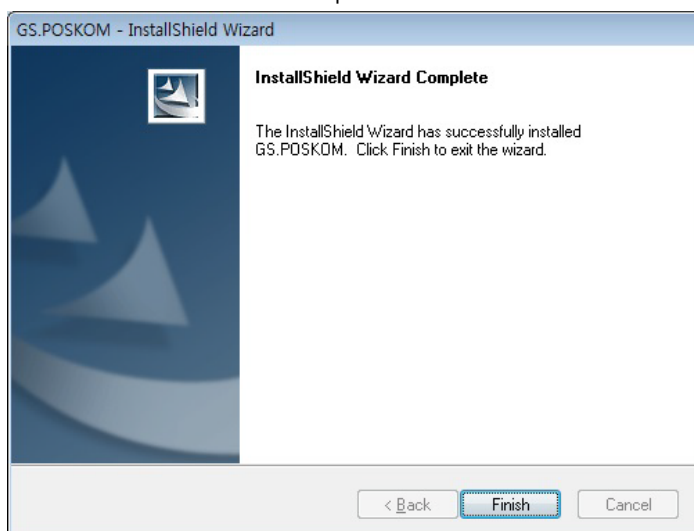


- After installing the Poskom Generator, copy the data file that has been calibrated to the GS installation folder, and the recording will proceed normally. Contact Poskom for the calibration method and the location of the data file.

- 1 Install **VXvue**.
- 2 Execute **GS.POSKOM.Setup.exe** file as administrator mode.
- 3 Click the **Install** button to start installing **GS.POSKOM**.

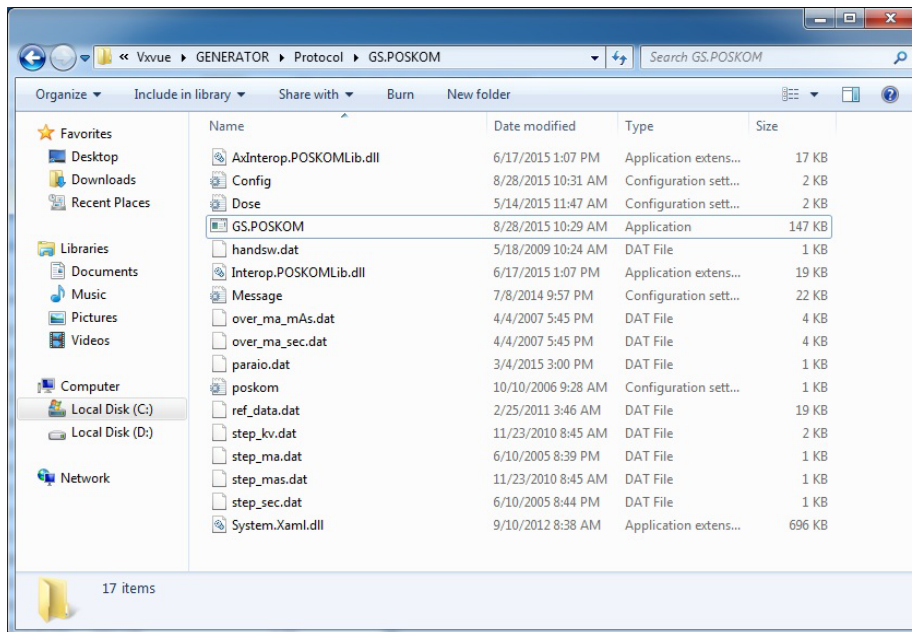


- 4 Click the **Finish** button to complete the installation.



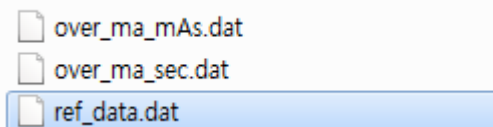
5 Check if the **GS.POSKOM** folder and the required files are installed in the following path.

- C:\Program files\WVXvue\GENERATOR\Protocol\GS.POSKOM\



6 AFTER THE INSTALLATION IS COMPLETE, COPY THE FILES THAT HAVE BEEN GENERATED BY THE GENERATOR TO THE FOLDER WHERE GS IS INSTALLED.

- Target File: ref\_data.dat, over\_ma\_mAs.dat, over\_ma\_sec.dat
- Copy path: C:\Program files\WVXvue\GENERATOR\Protocol\GS.POSKOM\

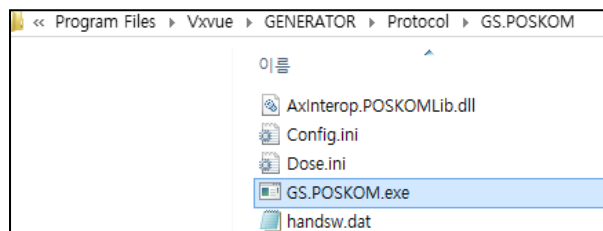


### Checking connection of the generator with PC

Check if the generator is connected normally after connecting the generator interface module box with PC.

1 Double click GS.POSKOM.EXE from the following path.

- C:\Program files\WVXvue\GENERATOR\Protocol\GS.POSKOM\



2 The program icon is indicated on the task bar.



3 Click the icon with a right mouse button and then a pop-up menu is opened.

- ShowWindow: Displays GS.POSKOM.EXE on the monitor.
- ExitWindow: Closes GS.POSKOM.EXE and turns off the Poskom generator.

### GS.POSKOM.EXE dialogue

If the generator is connected correctly, a snapping sound occurs three times from the generator when executing **GS.POSKOM.EXE**.

- Check the setting values of generator from the following dialogue.

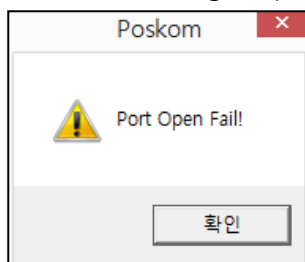
The screenshot shows the 'GS WINDOW' dialog box. It contains several sections:
 

- Items/Status:** A table showing the status of various items like Connect Status (CONNECTED), Error (NOT), Warning (NOT), Interlock (NOT), Ready Status (NORMAL), Focus (SMALL), and HU (0).
- Generator Option:** A list of options with checkboxes, many of which are checked by default, including MA\_ADJUSTABLE\_2P, MS\_ADJUSTABLE\_2P, MAS\_ADJUSTABLE\_3P, DOSEMODE\_1P\_ADJUSTABLE, DOSEMODE\_2P\_ADJUSTABLE, DOSEMODE\_3P\_ADJUSTABLE, FOCUS\_ADJUSTABLE, AEC\_3\_FIELD\_SUPPORT, AEC\_5\_FIELD\_SUPPORT, AEC\_DENSITY\_SUPPORT, AEC\_FILM\_SUPPORT, DAP\_SUPPORT, RECEPTOR\_MAPPING\_SUPPORT, PREPARATION\_SUPPORT, EXPOSURE\_SUPPORT, RESET\_SUPPORT, and SIZE\_ADJUSTABLE.
- AEC FILM SPEED:** Buttons for SLOW, MEDIUM, and FAST.
- BODY SIZE:** Buttons for BABY, THIN, NORMAL, and FAT.
- AEC FIELD:** Buttons for LEFT, CENTER, and RIGHT.
- DOSE CONTROL:** Sliders for KV (70), MA (100.000), MAS (0.500), and MS (0.005).
- DENSITY:** A slider set to 18.
- FOCUS:** Buttons for SMALL and LARGE.
- DOSE MODE:** Buttons for 1P, 2P, and 3P.
- BUCKY:** Buttons for NONE, BUCKY1, and BUCKY2.
- COMMAND:** Buttons for RESET and REBOOT.
- MESSAGE VGI:** A text area showing various status messages like 'Dose Mode=3', 'Focus value = 1', 'BUCKY=0', 'AEC FIELD STATE=0', 'DOSE INFORMATION / DENSITY / HU', and 'Exposure state=0'.
- MESSAGE PXR:** A text area showing detailed step information like 'GET STEP, Type=GS\_PXR\_KV\_STEP, Value=0, StepIndex=30, Mode=1', 'CHECK OVER, kVStep=30, MAIndex=10, VIndex=4, Mode=SEC\_MODE', and various 'PXR NOT IF UPDATE' messages for DOSE, FOCUS, SCALE, and MAS.
- Buttons:** ON, OFF, EXIT, READY, and EXPOSURE.



- Among the generator options, the options supported by Poskom are checked only as default.
- The other options cannot be operated even though you check them manually.

- The error message displays if the connection is failed.




- The probable causes of failure in the connection or initialization of generator
  - The generator version is unmatched.
  - The generator ROM is not used for controlling PC.
  - Contact inferiority of the cable
  - The generator interface module box is defective.
  - Data file calibrated for the generator is not applied to GS.

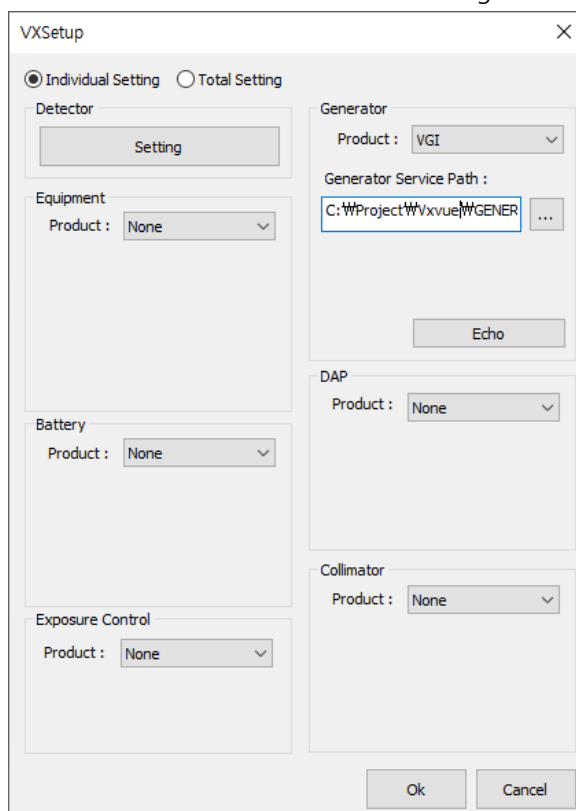


- Contact **Poskom** for checking the generator ROM.

### 3.9.2 How to Set Poskom Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - Product: VGI
- 3 Click  button to input the path of GS.POSKOM.exe (Generator Service).
  - Ex.) C:\Program files\WVXvue\GENERATOR\Protocol\GS.POSKOM\GS.POSKOM.exe
- 4 Click the **Echo** button to check the connecting status.



- 5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a USB port of generator interface module box before setting items in VXSetup.

## VXvue



- The Poskom generator is integrated directly with VXvue and VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping receptor(Bucky) and detector installed in the receptor.
- The generator supports up to 4 receptors: Non-Bucky, Stand, Table, and Aux.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.9.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.9.4 How to Use Poskom Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You can perform the following functions.
  - Using AEC function
  - Adjusting **kVp**, **mA** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**


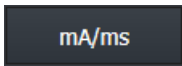
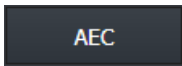




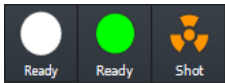

Items	Image							
2 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
AEC	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼



- From Poskom generator, it is possible to change mA under the 2 points mode.
- From Poskom generator, it is possible to set the maximum limitation for operating mAs under the AEC mode.

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **Poskom** generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted. Enable to adjust <b>mA</b> .
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	<b>AEC</b>	Enable to apply AEC functions.
	<b>AEC Field</b> (Left / Center / Right)	Select an AEC field to use. Default setting: <b>Center</b> Enable to select multiple AEC fields.
	<b>Density</b>	Enable to adjust the density of AEC.
	<b>Focal Spot Size</b> (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>Reset</b>	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. Click this icon at this time to start reset.
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator. <b>Ready</b> (White) - Standby <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1 <sup>st</sup> level switch (Ready) of the generator. <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2 <sup>nd</sup> level switch (Exposure) of the generator.
	<ul style="list-style-type: none"> <li>Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about the <b>VXvue</b>.</li> </ul>	

## Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.9.5 Error and Warning Messages of Poskom Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Reboot the generator if an error message shows.

Error Code	Message
ERR 01	CHARGE MONITOR ERROR(HT-CONT)
ERR 02	OVER TIME ERROR(CONSOLE)
ERR 03	READY INPUT ERROR AT POWER ON(HT-CONT)
ERR 04	X-RAY INPUT ERROR AT POWER ON(HT-CONT)
ERR 05	READY INPUT ERROR AT POWER ON(CONSOLE)
ERR 06	X-RAY INPUT ERROR AT POWER ON(CONSOLE)
ERR 07	HAND SWITCH READY INPUT ERROR AT POWER ON
ERR 08	HAND SWITCH X-RAY INPUT ERROR AT POWER ON
ERR 09	ROTOR FEEDBACK DETECT ERROR AT POWER ON
ERR 10	FILAMENT CURRENT DETECT ERROR AT POWER ON
ERR 11	kV FEEDBACK DETECT ERROR AT POWER ON
ERR 12	mA FEEDBACK DETECT ERROR AT POWER ON
ERR 13	ROTOR FEEDBACK DETECT ERROR AT READY STATE
ERR 14	FILAMENT CURRENT DETECT ERROR AT READY STATE
ERR 15	kV FEEDBACK DETECT ERROR AT EXPOSURE
ERR 16	mA FEEDBACK DETECT ERROR AT EXPOSURE
ERR 17	Not defined
ERR 18	X-RAY TIME OVER IN sec MODE
ERR 19	X-RAY TIME OVER IN mAs MODE
ERR 20	X-RAY TIME OVER IN AEC MODE
ERR 21	HV INTERLOCK ERROR AT POWER ON
ERR 22	IGBT FAULT ERROR AT EXPOSURE
ERR 23	Kv FEEDBACK OVER DETECT ERROR AT EXPOSURE
ERR 24	mA FEEDBACK OVER DETECT ERROR AT EXPOSURE
ERR 25	NO ZERO-CROSS OR NO INPUT AT POWER ON
ERR 26	ZERO-CROSS OVER OR WRONG INPUT AT POWER ON
ERR 27	BUCKY 1 OK SIGNAL ERROR AT EXPOSURE(HT-CONT)
ERR 28	BUCKY 2 OK SIGNAL ERROR AT EXPOSURE(HT-CONT)
ERR 29	AEC LEVEL LOW ERROR AT EXPOSURE(HT-CONT)
ERR 30	AEC LEVEL LOW ERROR AT READY(HT-CONT)
ERR 31	I/F BOARD-IN ERROR(HT-CONT)
ERR 32	AEC BOARD-IN ERROR(HT-CONT)
ERR 33	SMALL-FOCUS SELECTION ERROR (HT-CONT)
ERR 34	LARGE-FOCUS SELECTION ERROR (HT-CONT)

<b>ERR 35</b>	COMMUNICATION ERRORCOMMUNICATION ERROR (BETWEEN CONSOLE AND SERVICE TOOL)
<b>ERR 36</b>	EXPOSURE COUNT ERROR AT AUTO CALIBRATION

- Click the **Reset** button if the check message shows.
  - Reboot the generator if 'CH 07' code occurs.

Check Code	Message
<b>CH 01</b>	TUBE THERMOSTAT OPERATION
<b>CH 02</b>	When another switch is pushed during exposure
<b>CH 03</b>	When ready switch on CONSOLE is released during exposure
<b>CH 04</b>	When X-ray switch on CONSOLE is released during exposure
<b>CH 05</b>	When a hand switch(READY) is released during exposure
<b>CH 06</b>	When a hand switch(x-ray) is released during exposure
<b>CH 07</b>	Shortage of power-supply capacity for exposure
<b>CH 08</b>	Simultaneous exposure prohibition
<b>CH 09</b>	Warning to X-rays room door opening
<b>CH 10</b>	AEC Level Error - When there is not enough x-rays at AEC reference level(voltage)

### 3.10 DK

This section explains about the integration process between **VXvue** and the **DK** generator models.

#### Interlock Condition

Connects RS-232, which complies with the communication standard to the box of generator interface module provided by **DK**. After that, connect the module box to PC with a USB cable.



- Contact **DK** about the box of generator interface module with a form of mini console.

#### Integrated Model

Accuray-5D, Accuray-6D

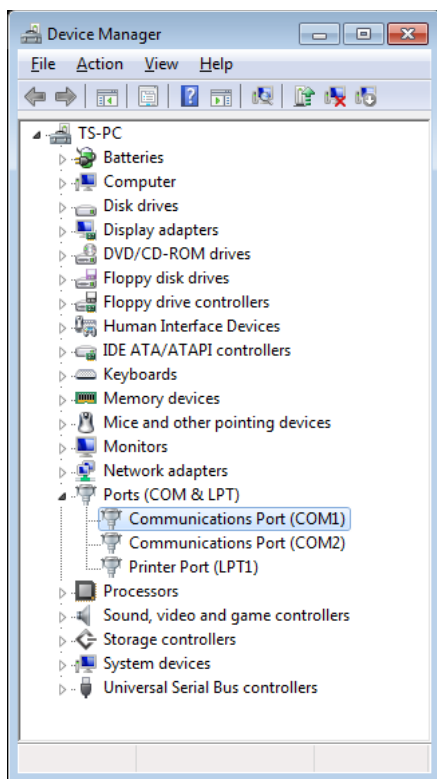
Mapped VXvue ver.	DK Accuray Generator Firmware ver.
V1.0.0.85b18	V1.01
V1.0.0.85b21 (Multi detectors unsupported)	V1.02, V1.04
V1.0.0.86b20	V1.04



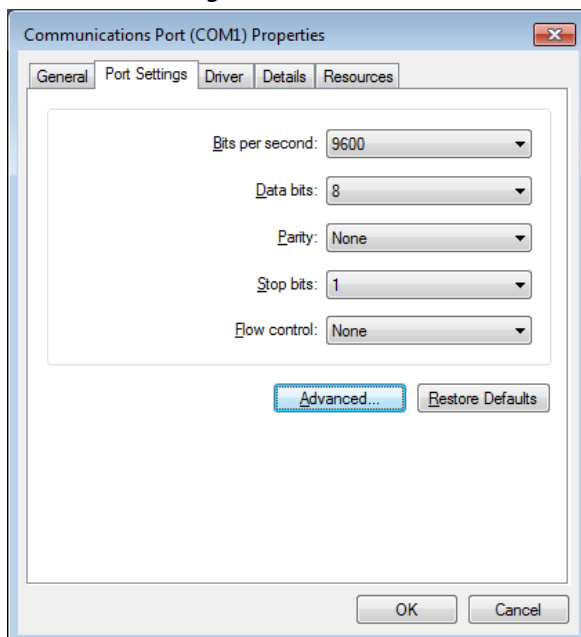
- Some **DK** generator models cannot be integrated with **VXvue** depending on their specifications.

#### 3.10.1 How to Set Port from PC

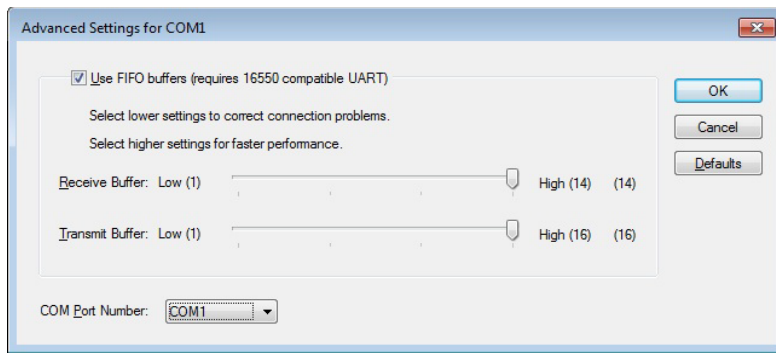
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right Click the **Communications Port** menu. Then click **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click **OK** button after appointing **COM Port Number** to be used.

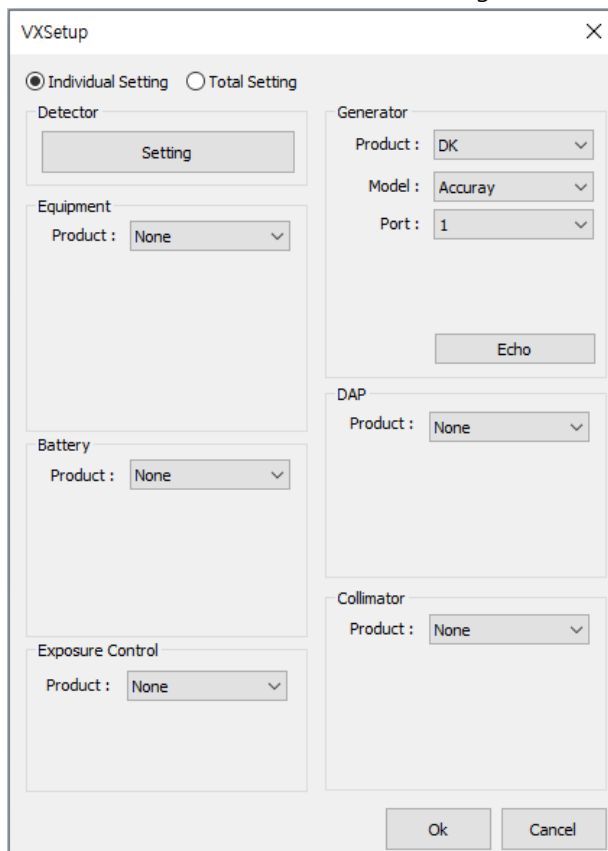


- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.10.2 How to Set DK Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - Product: DK
  - Model: Accuray
  - Port: COM port number configured from PC. (Refer to <3.10.1 How to Set Port from PC>)
- 3 Click the **Echo** button to check the connecting status.



- 4 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.
- Before you set items of generator in VXSetup, check if the generator module box is connected to PC with a USB cable normally.

## VXvue



- The DK generator is integrated directly with VXvue.
- Refer to <**3.1.1 Generator Interlock setting**> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.
- The generator supports up to 4 receptors: Non-Bucky, Stand, Table, and AUX



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.10.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **kVp / mAs / mA / Density / Density / Focal Spot / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...	Focal Spot
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.10.4 How to Use DK Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

- You can perform the following functions:
  - Adjusting kVp, mA and mAs
  - Adjusting mA and ms instead of mAs
  - Using AEC function or adjusting kVp and mAs

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
AEC (If max limitation is mAs)	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100



- You can change the value of **mA** under 2 points mode from the **DK** generator.



- The range of dose that the user adjusts depends on the generator settings, different from the dose table provided to the protocol. Ask DK (manufacturer) for the setting of dose value of the DK generator.



- The AEC Chamber can be connected with **DK** generator.
  - The maximum limitation for operating **ms** and **mAs** can be configured under the **AEC** mode.
  - It supports 6 modes. (AEC Off, AEC L, AEC R, AEC C, AEC L/R, AEC L/C/R)
  - If the AEC configured in Step of Procedure Manager (VXvue) is L/C or C/R, it is configured in one direction. (Ex. L/C → L, C/R → R)
- Even though **AEC Chamber** is not connected with the **DK** generator actually, the **AEC** icon in **VXvue** becomes activated if **AEC** is set to at least one bucky in the generator.
- Ask **DK** (manufacturer) for the connection and setting of **AEC** to the **DK** generator.



- The **DK** generator can be connected with **DAP** directly to integrate with **VXvue**. Ask **DK** (manufacturer) for the information of connecting and setting **DAP** with **DK** generator.

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with **DK** generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted. <ul style="list-style-type: none"> <li>Enable to adjust <b>mA</b>.</li> </ul>
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	<b>AEC</b>	Enable to apply AEC functions. <ul style="list-style-type: none"> <li>Enable to set either <b>mAs</b> or <b>ms</b> as a limiting value.</li> </ul>

	<b>AEC Field</b> (Left / Center / Right)	<p>Select an AEC field to use.</p> <ul style="list-style-type: none"> <li>• Default setting: Center</li> <li>• Enable to select multiple AEC fields.</li> <li>• Coincident selection of Left-Center and Center-Right is not supported.</li> </ul>
	<b>Density</b>	<p>Enable to adjust the density of AEC.</p>
	<b>Film / Screen</b>	<p>Sets film / screen (sensitivity) of AEC.</p> <ul style="list-style-type: none"> <li>• <b>Slow, Normal, Fast</b></li> </ul>
	<b>Focal Spot Size</b> (Small / Large)	<p>Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.</p>
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

## Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.10.5 Error and Warning Messages of DK Generator

- Error Code 1~8: The generator is converted into the error phase and cannot be recovered before rebooting it.
- Error Code less than 10: An error or warning message irrelevant to rebooting the generator. (Except the error code 6)



- Contact the generator manufacturer if the error or warning messages keep displaying even though you reboot the generator.

Error Code	Message
001	EXP Fail
002	AEC Fail
003	DET Req
004	GRID Req
005	Door Open
006	Tube Temp Over
007	CAP Bank Check
008	X-ray Key input Check

Error Code	Message
010	Charge Monitor Error
011	Zero Cross Over (65Hz)
012	Zero Cross Low (45Hz)
013	Rotor Voltage Check High
014	Rotor Voltage Check Low
015	STB Filament Voltage Check High
016	STB Filament Voltage Check Low
017	EXPO Fil FB Level Error
018	EXPO Fil kV Level Error
019	EXPO Fil mA Level Error
020	H/W kV FB Max Over
021	H/W mA FB Max Over
022	H/W +kV Level Error
023	H/W -kV Level Error
024	Tank Interlock
025	IGBT OCP Fault Error
026	IGBT Temp Fault Error

### 3.11 IDETEC

This section explains about the integration process between **VXvue** and the **IDETEC** generator models.

#### Interlock Condition

Complies with the communication standard of RS-232.

#### Integrated Model

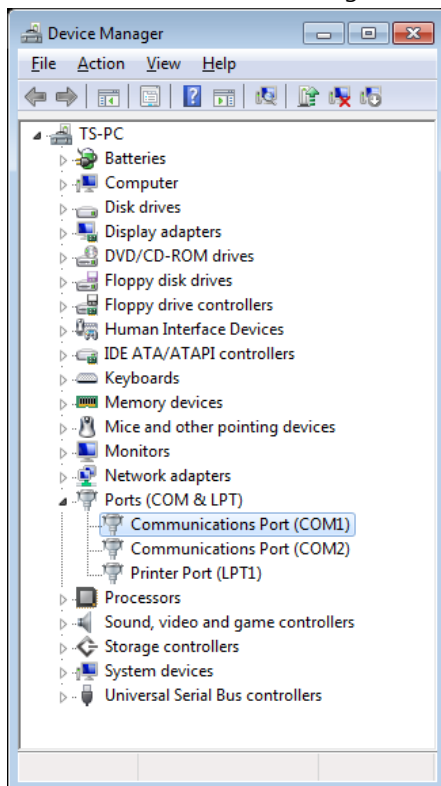
IDETEC V8, V6 generators



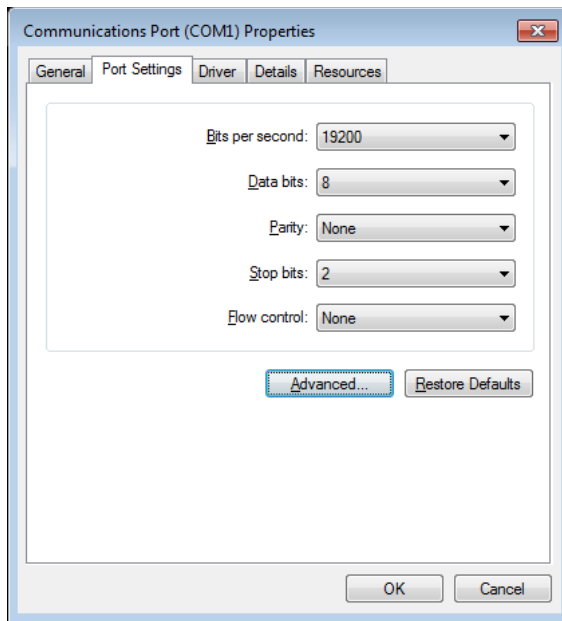
- Some **IDETEC** generator models cannot be integrated with **VXvue** depending on their specifications.

#### 3.11.1 How to Set Port from PC

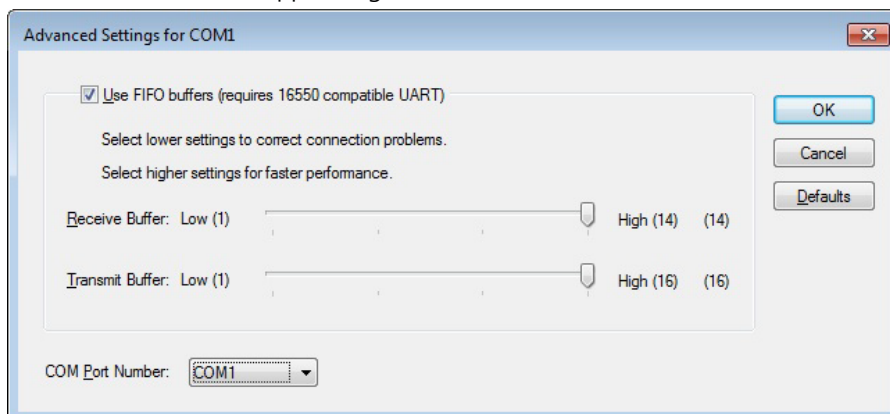
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the Communications **Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.11.2 How to Set IDETEC Generator in VXSetup and VXvue

#### VXSetup

- 1 Run VXSetup and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: IDETEC
  - Model: MOBILE
  - Port: COM port number configured from PC. (Refer to <3.11.1 How to Set Port from PC>)
- 3 Click the **Echo** button to check the connecting status.

4 Click the OK button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.

## VXvue



- The IDETEC generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

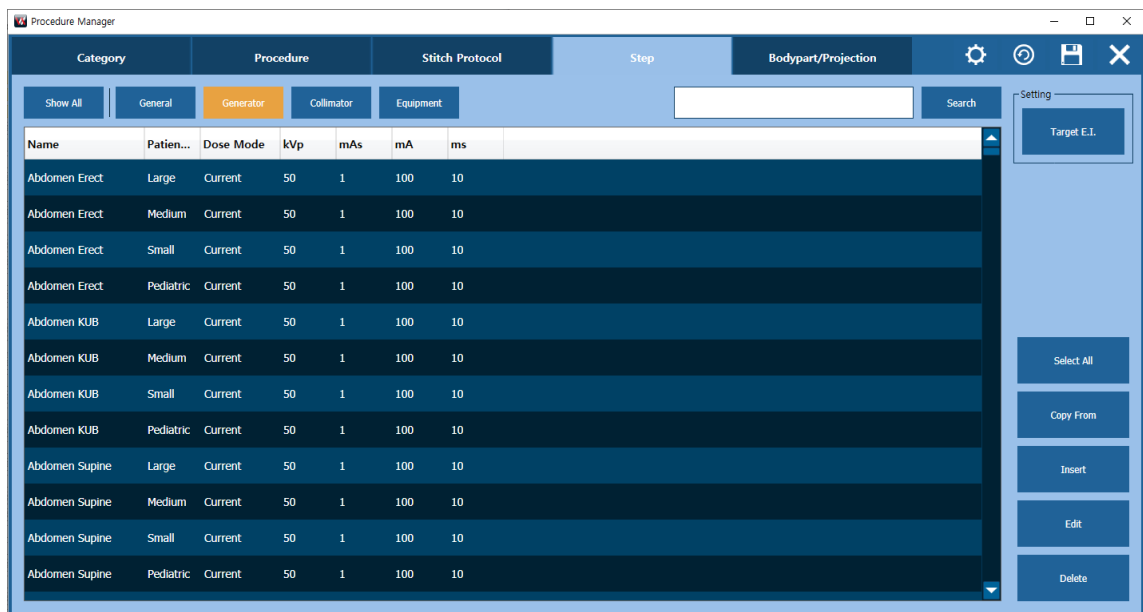
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.11.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.11.4 How to Use IDETEC Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)






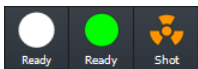
You can perform the following functions.

- Adjusting **kVp** and **mAs**
- Adjusting **mA** and **ms** instead of **mAs**

Items	Image					
2 points	70	kVp	▲	▼	20	mAs
	200	mA	▲	▼	100	ms
3 points	70	kVp	▲	▼	20	mAs
	200	mA	▲	▼	100	ms

### Icons

The inactive icons are not supported when the viewer program is integrated with the **IDETEC** generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	<b>Focal Spot Size (Small / Large)</b>	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>Reset</b>	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>Click this icon at this time to start reset.</li> </ul>
	<b>Heat Units (Anode)</b>	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>0&lt;HU≤50: Green</li> <li>50&lt;HU≤80: Yellow</li> <li>80&lt;HU: Red</li> </ul>
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li><b>Ready</b> (White) - Standby</li> <li><b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li> <li><b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### 3.11.5 Error and Warning Messages of IDETEC Generator



- Contact the generator manufacturer for the information of error and warning messages of the IDETEC generator.

## 3.12 DIRA

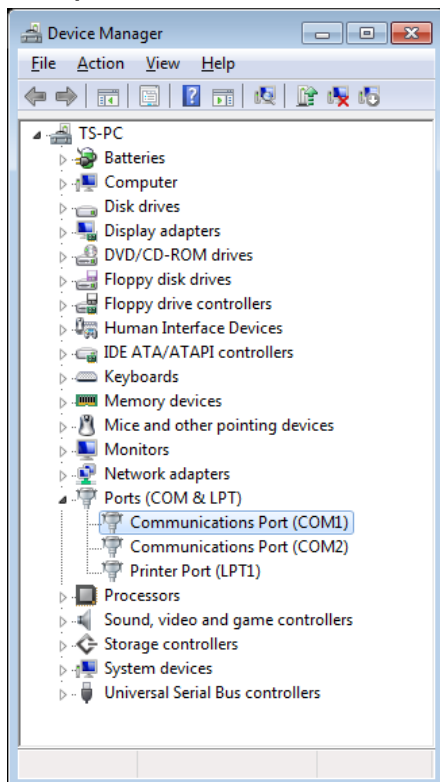
This section explains about the direct integration between **VXvue** and the **DIRA** generator model.

### Interlock Condition

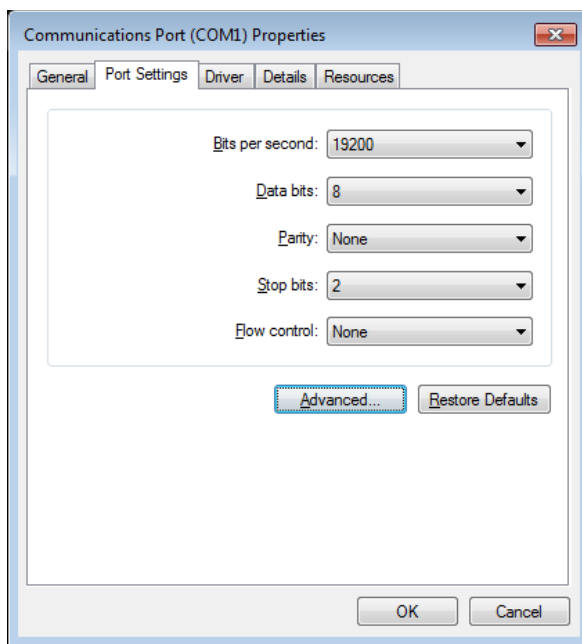
Comply with the communication standard of RS-232.

#### 3.12.1 How to Set Port from PC

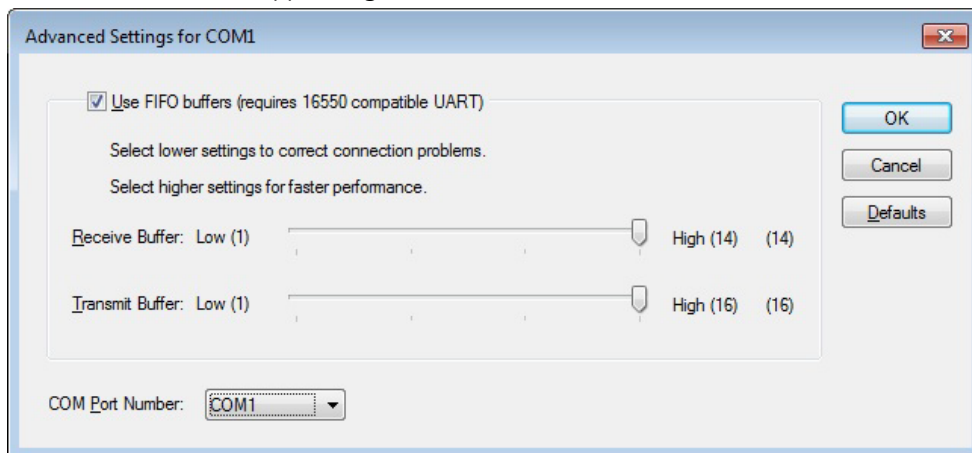
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



- 3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port** Number to be used.

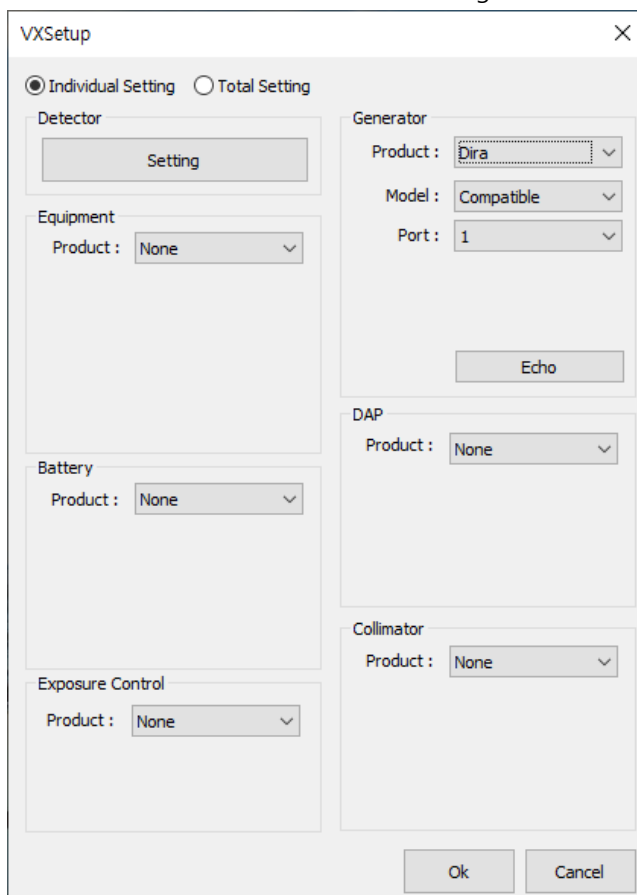


- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.12.2 How to Set DIRA Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: Dira
  - Model: Compatible
  - Port: COM port number configured from the PC. (Refer to <3.12.1 How to Set Port from PC>.)
- 3 Click the **Echo** button to check the connecting status.



- 4 Click the **OK** button to save the settings.



- Check if the PC and generator are connected with a cable (RS-232c) properly before setting items related to the generator in VXSetup.

#### VXvue



- The DIRA generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.
- The generator supports up to 4 receptors: Non-Bucky, Stand, Table, and AUX



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.12.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.12.4 How to Use DIRA Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check communication status between the generator and PC. (Ex. port settings, etc.)



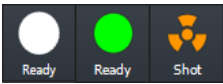

- You can perform the following functions.
  - Using AEC function
  - Adjusting kVp and mAs
  - Adjusting mA and ms instead of mAs

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
AEC	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

#### Icons

The icons disabled in UI are not supported ones when the viewer is integrated with **DIRA** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> , <b>ms</b> can be adjusted.
	AEC	Enable to apply AEC functions.
	AEC Field (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>Default setting: Center</li> <li>Enable to select multiple AEC fields.</li> </ul>
	Density	Enable to adjust the density of AEC.
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.


	<b>Reset</b>	The <b>Reset</b> icon is activated and an error message is indicated when a soluble error occurs by resetting the system. Click the icon at this time to start reset.
	<b>Heat Units (Anode)</b>	<p>The color of icon changes according to the heat units.</p> <ul style="list-style-type: none"> <li>• <math>0 &lt; HU \leq 50</math>: Green</li> <li>• <math>50 &lt; HU \leq 80</math>: Yellow</li> <li>• <math>80 &lt; HU</math>: Red</li> </ul>
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.12.5 Error and Warning Messages of DIRA Generator

	<ul style="list-style-type: none"> <li>• Contact the manufacturer of generator if error or warning messages keep displaying even though you click the <b>Reset</b> button or reboot the generator.</li> </ul>
---	---

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Message

Code	Error Message
3	Generator CPU EEPROM Data Checksum Error
4	Generator CPU Real Time Clock error
5	Main Contactor error
6	Rotor Fault
7	Filament Fault
9	Beam_Cathode Fault
10	Beam_Anode Fault
11	Beam_INVA Fault

12	Beam_INVB Fault
13	Beam_KV Fault
14	Beam_IR Fault
15	Beam KV too low
16	Beam kv unbalance
17	Inverter is too hot
18	Preparation Time-out Error
20	No KV during exposure
21	mA during exposure too high
22	mA during exposure too low
23	Manually Terminated Exposure
24	AEC Back-up Timer - Exposure Terminated
25	AEC MAS Exceeded - Exposure Terminated
27	Anode Heat Limit
28	Thermal Switch Interlock Error
29	Door Interlock Error
31	Bucky 1 Not Contact Error
33	Bucky 2 Not Contact Error
34	Prep Input active during Initialization Phase
35	X-ray Input active during Initialization Phase
36	Communication Error Console
37	+12VDC Error
38	-12VDC Error
43	High Voltage Error - KV detected in non x-ray state
44	Invalid Communication Message
45	Communication Message Not Supported
46	Communication Message Not Allowed
48	Current reception is not enabled
49	AEC channel is not enable in current reception
51	AEC Feedback Error (No Feedback Signal Detected)
52	High Small Focus Filament Current Error in Standby
53	High Large Focus Filament Current Error in Standby
54	AEC Reference out of range
55	No Fields Selected in AEC mode
56	No Tube Programmed
57	AEC Stop signal in wrong state
60	High KV Error
61	Low KV Error
71	Boost filament current error
72	Preheat filament current error
73	Film screen is invalid

74	DC BUS voltage is too higher or too low
75	Tube count data corrupt
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
103	Calibration Error - Manually Terminated
104	Calibration Error - No mA
105	Calibration Error - Minimum mA not calibrated
106	Generator Limit, Selected Parameter Not calibrated
107	pre-charge relay fault
108	large filament set parameter is more than max. filament current
109	small filament set parameter is more than max. filament current.

### Warning Message

Code	Warning Message
200	Anode Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit
212	Generator AEC Density Limit
213	Invalid Communication Parameter
214	Housing Heat Warning2

### 3.13 HGHV

This section explains about the integration process between **VXvue** and the **HGHV** generator models.

#### Interlock Condition

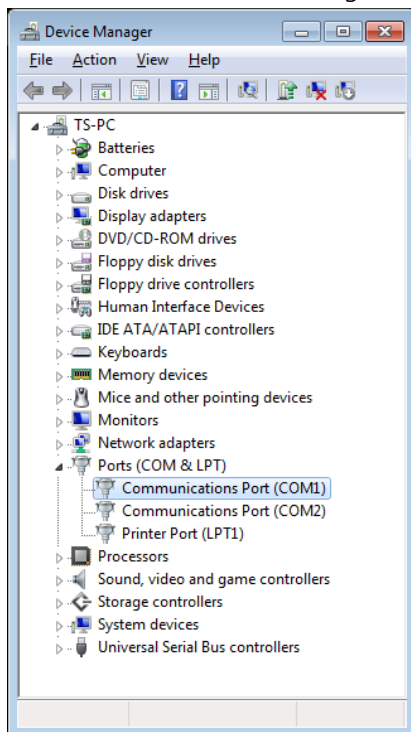
Complies with the communication standard of RS-232.

#### 3.13.1 How to Set Port from PC

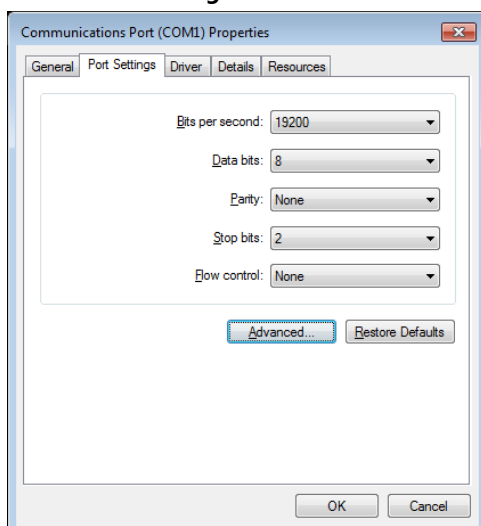
1 Run **Device Manager** by selecting one of the two steps as follows.

- **Control Panel → System and Security → Select System → Device Manager**
- **Start → Input Device Manager to Windows Search**

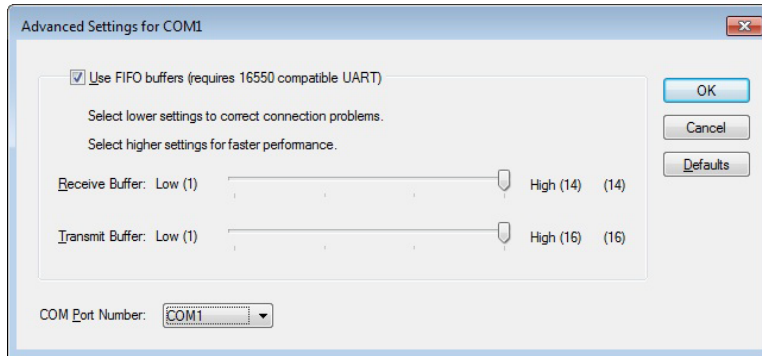
2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port Number** to be used.

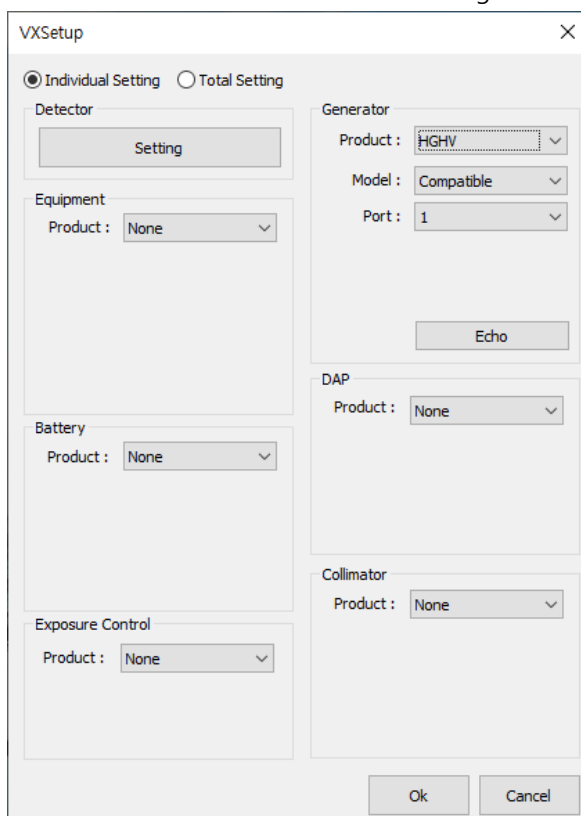


- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.13.2 How to Set HGHV Generator in VXSetup and VXvue

#### VXSetup

- Run **VXSetup** and click the **Individual Setting** button.
  - Set each item of the **Generator** menu as follows:
    - Product: HGHV
    - Model: Compatible
    - Port: COM port number configured from PC. (Refer to <3.13.1 How to Set Port from PC>)
- Click the **Echo** button to check the connecting status.



- 3 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.



- The HGHV generator is integrated directly with VXvue.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

### 3.13.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
 ▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms
Abdomen Erect	Large	Current	50	1	100	10
Abdomen Erect	Medium	Current	50	1	100	10
Abdomen Erect	Small	Current	50	1	100	10
Abdomen Erect	Pediatric	Current	50	1	100	10
Abdomen KUB	Large	Current	50	1	100	10
Abdomen KUB	Medium	Current	50	1	100	10
Abdomen KUB	Small	Current	50	1	100	10
Abdomen KUB	Pediatric	Current	50	1	100	10
Abdomen Supine	Large	Current	50	1	100	10
Abdomen Supine	Medium	Current	50	1	100	10
Abdomen Supine	Small	Current	50	1	100	10
Abdomen Supine	Pediatric	Current	50	1	100	10



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.13.4 How to Use HGHV Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

- You can perform the following functions.
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

Items	Image							
2 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼

#### Icons

The inactive icons are not supported when the viewer program is integrated with the **HGHV** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted. <ul style="list-style-type: none"> <li>• Enable to adjust <b>mA</b>.</li> </ul>
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>• Click this icon at this time to start reset.</li> </ul>
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• 0&lt;HU≤50: Green</li> <li>• 50&lt;HU≤80: Yellow</li> <li>• 80&lt;HU: Red</li> </ul>
	X-ray Status	The icons and their color are changed depending on the status of generator.

- Ready (White) - Standby
- Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.
- Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.13.5 Error and Warning Messages of HGHV Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Warning: Performing other actions will dismiss the display
- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Message

Code	Error Message
1	Generator CPU EPROM Checksum Error
2	Generator CPU EEPROM Data Checksum Error
3	Generator CPU NVRAM Error
4	Generator CPU Real Time Clock error
5	Main Contactor error
6	Rotor Fault
7	Filament Fault
8	kV-mA Fault (Beam Fault)
9	Power Supply Not Ready
10	No KV during exposure
11	mA during exposure too high
12	mA during exposure too low
13	Manually Terminated Exposure
14	AEC Back-up Timer-Exposure Terminated
15	AEC MAS Exceeded - Exposure Terminated

16	Tomo Back-up Timer-Exposure Terminated
17	Uncalibrated Exposure Parameter
18	Preparation Time-out Error
19	Anode Heat Limit
20	Thermal Switch Interlock #1 Error
21	Thermal Switch Interlock #2 Error
22	Door Interlock Error
23	Collimator Interlock Error
24	Cassette Interlock Error
25	II Safety Interlock Error
26	Spare Input Interlock Error
27	Receptor Time-out Error
28	Prep Input active during Initialization Phase
29	X-ray Input active during Initialization Phase
30	Fluoro Input active during Initialization Phase
31	Communication Error Remote Fluoro
32	Communication Error Console
33	Lithium Battery Low Voltage Error
34	12VDC Error
35	Bucky 1 Not Contact Error
36	Bucky 2 Not Contact Error
37	+12VDC Error
38	-12VDC Error
43	High Voltage Error - KV detected in non x-ray state
44	Invalid Communication Message
45	Communication Message Not Supported
46	Communication Message Not Allowed
48	Current reception is not enabled
49	AEC channel is not enable in current reception
51	AEC Feedback Error (No Feedback Signal Detected)
52	High Small Focus Filament Current Error in Standby
53	High Large Focus Filament Current Error in Standby
54	AEC Reference out of range
55	No Fields Selected in AEC mode
56	No Tube Programmed
57	AEC Stop signal in wrong state
60	High KV Error
61	Low KV Error
71	Boost filament current error
72	Preheat filament current error
73	Film screen is invalid

74	DC BUS voltage is too higher or too low
75	Tube count data corrupt
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
103	Calibration Error - Manually Terminated
104	Calibration Error - No mA
105	Calibration Error - Minimum mA not calibrated
106	Generator Limit, Selected Parameter Not calibrated
107	pre-charge relay fault
108	large filament set parameter is more than max. filament current.
109	small filament set parameter is more than max. filament current.

### Warning Message

Code	Warning Message
200	Anode Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit
212	Generator AEC Density Limit
213	Invalid Communication Parameter
214	Housing Heat Warning2
249	Calibration Error - Check EEPROM
251	#1 Inverter Board Error
252	#2 Inverter Board Error
253	#3 Inverter Board Error
254	Anode Plate Error
255	Cathode Plate Error

### 3.14 Anthem (DEL)

This section explains about the integration between **VXvue** and the **Anthem (DEL)** generator model.

#### Interlock Condition

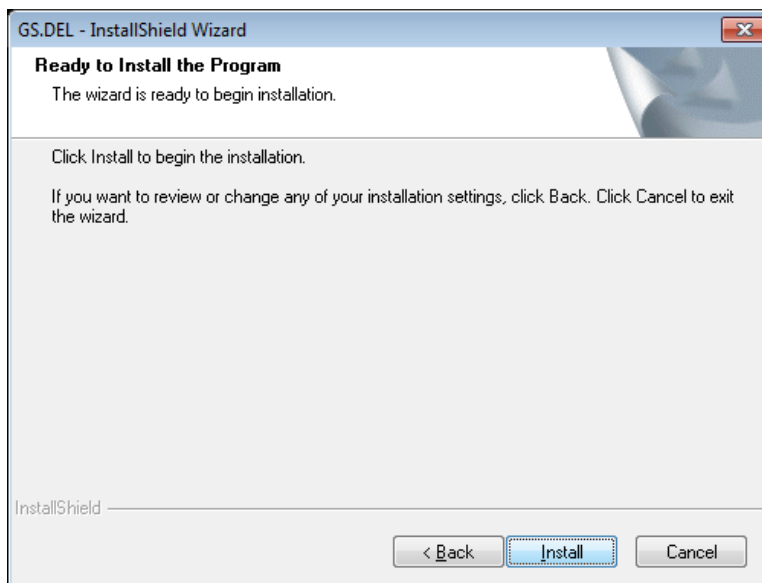
Complies with the communication standard of RS-232.

#### 3.14.1 How to Install GS

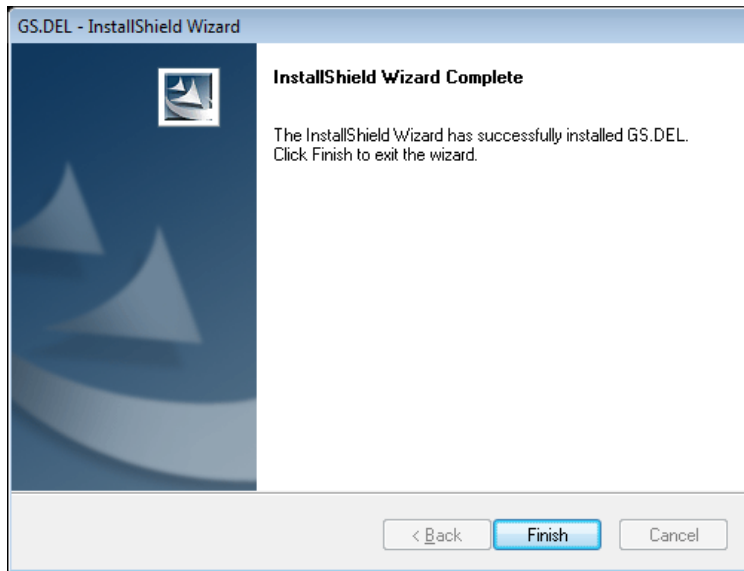


- To use the Anthem (DEL) generator, you must install GS.DEL.Setup.exe separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install VXvue.
- 2 Run the GS.DEL.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.

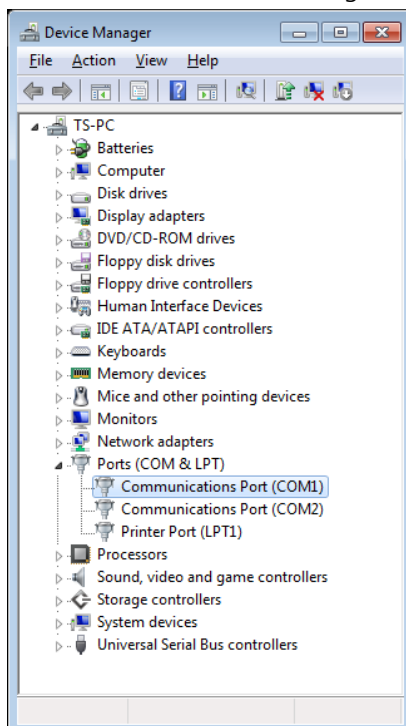


- 5 After the installation is complete, check that the GS.DEL folder and sub files are installed normally in the following path.

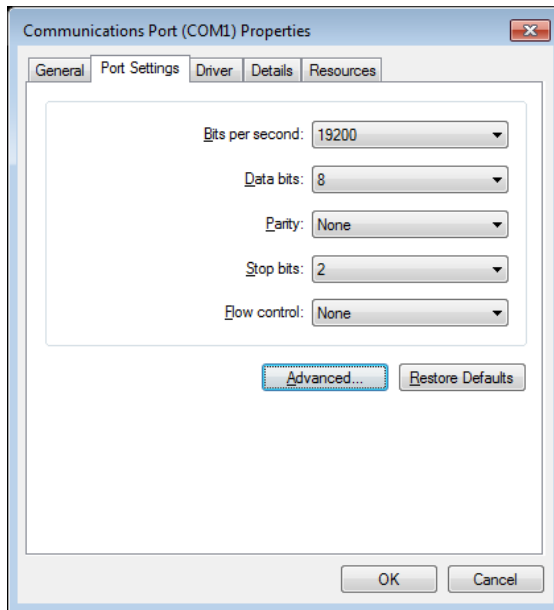
▫ C:\Program files\WVXvue\GENERATOR\Protocol\GS.DEL\

### 3.14.2 How to Set Port from PC

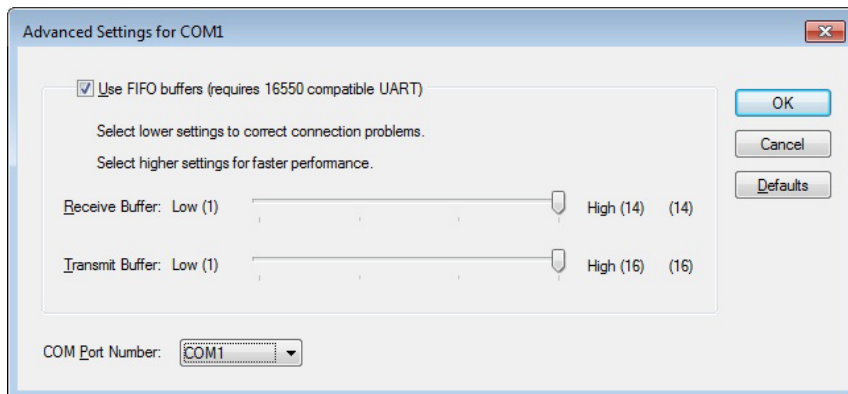
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications** Port menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.



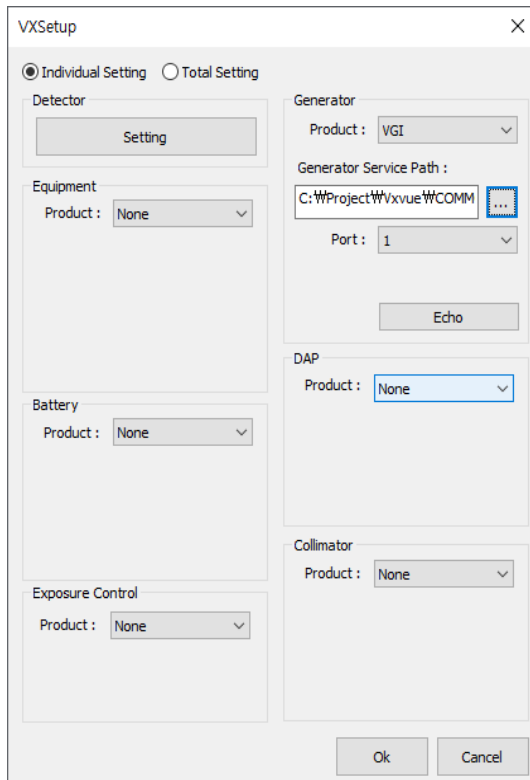
- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.14.3 How to Set Anthem Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - Product: VGI
  - Port: COM port number configured from PC. (Refer to <3.14.2 How to Set Port from PC>)
- 3 Click  button and enter the path of GS.DEL.exe (Generator Service) prepared in <3.14.1 How to Install GS>.
  - Ex.) C:\Program files\WVXvue\WGENERATOR\WProtocol\WGS.DEL\WGS.DEL.exe

4 Click the **Echo** button to check the connecting status.



5 Click the **OK** button to save the settings.



- Before setting up the generator in VXSetup, make sure that the PC and the generator are properly connected with the cable (RS-232c).

## VXvue



- The Anthem (DEL) generator is integrated with VXvue via VGI.
- For the integration method and configuration files (xml) of generator, refer to <3.1.1 Generator Interlock setting>.

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.14.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / Density / Focal Spot / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...	Focal Spot
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.14.5 How to Use Anthem (DEL) Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.  
Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

- You can perform the following functions.
  - Using AEC function
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

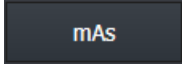







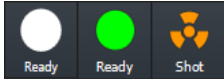

Items	Image							
2 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
AEC (Backup: ms, mAs)	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼



- The Anthem (DEL) generator supports AEC Backup mode, which allows you to set the maximum limit at which ms and mAs will operate when shooting in AEC mode. Prior to AEC mode selection, depending on the ms or mAs mode selected, the AEC Backup mode is also set the same.
  - mAs: Set the maximum limit of mAs required for shooting in AEC mode.
  - ms: Sets the maximum limit of ms required for shooting in AEC mode.
- Contact your generator manufacturer, DEL, for instructions on how to set the backup value in AEC Backup mode.

## Icons

The inactive icons are not supported when the viewer program is integrated with the Anthem (DEL) generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>ms</b> can be adjusted.
	<b>AEC</b>	Enable to use the AEC function.
	<b>AEC Field (Left / Center / Right)</b>	<p>You can select the AEC field you want to use.</p> <ul style="list-style-type: none"> <li>• Default: Left</li> <li>• Multiple AEC fields can be selected.</li> </ul>
	<b>Density</b>	You can adjust the density of AEC.
	<b>Film / Screen</b>	<p>You can set the AEC film / screen (sensitivity).</p> <p><b>100, 200, 300, 400, 600, 800, CR</b></p>
	<b>Focal Spot Size (Small / Large)</b>	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>Reset</b>	<p>When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message.</p> <ul style="list-style-type: none"> <li>• Click this icon at this time to start reset.</li> </ul>
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

## Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.14.6 Error and Warning Messages of Anthem (DEL) Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click this button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

#### Error Message

Code	Error Message
0	None
1	Inverter Com. Error
2	Premature release of Exp. Button
3	Backup mAs Termination
4	Inverter Terminated Exposure
5	ION Chamber Flt
6	SD Card Write Protect
7	Configuration Flash Fault
8	Flash Programming Error
9	Exceeds Heat Limit
10	Exceeds Generator Limit
11	Exceeds Tube Limit
12	Spare 1
13	Spare 2
14	No Bucky Selected
15	No AEC on Bucky
16	mA Hi Fault
17	mA Feedback Fault
18	kVp Hi Fault",
19	kVp Feedback Fault
20	kVp Imbalance Fault
21	IPM Fault
22	Filament PCB Fault
23	Filament Hi Fault
24	No Filament Fault
25	Soft Charge Fault
26	No Feedback Cable
27	Door Open
28	Collimator Fault
29	Xray Tube Overheat
30	Wall Bucky Not Ready

31	Table Bucky Not Ready
32	Rotor Not Ready
33	Spare 3
34	kVp DAC Fault
35	mA DAC Fault
36	Filament DAC Fault
37	AEC DAC Fault
38	Exceeds Limits - Calibration
39	Exceed Prep Time
40	Inverter Flash Fault
41	Values Reset - Calibration
42	Spare4
43	Exposure Disable
44	SD Card Failure - Init
45	Console Data Tx/Rx Failure
46	Inverter Data Tx/Rx Failure

### 3.15 CPI.CMP150

This section explains about the integration between **VXvue** and the **CPI.CMP150** generator models.

#### Interlock Condition

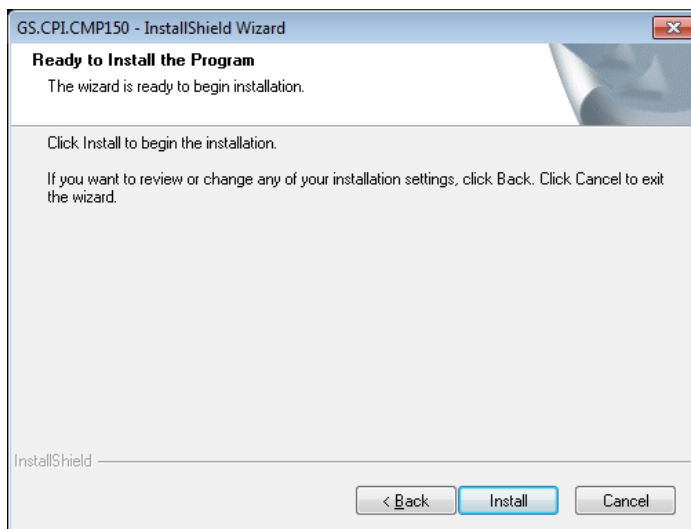
Complies with the communication standard of RS-232.

#### 3.15.1 How to Install GS

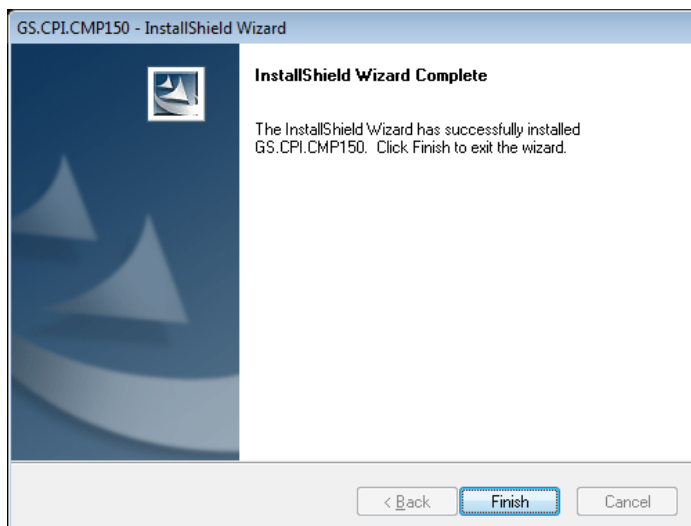


- To use **CPI.CMP150** generator, you must install **GS.CPI.CMP150.Setup.exe** separately. If you need the installation file, please contact a person in charge in Viewworks.

- 1 Install VXvue.
- 2 Run the GS.CPI.CMP150.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.

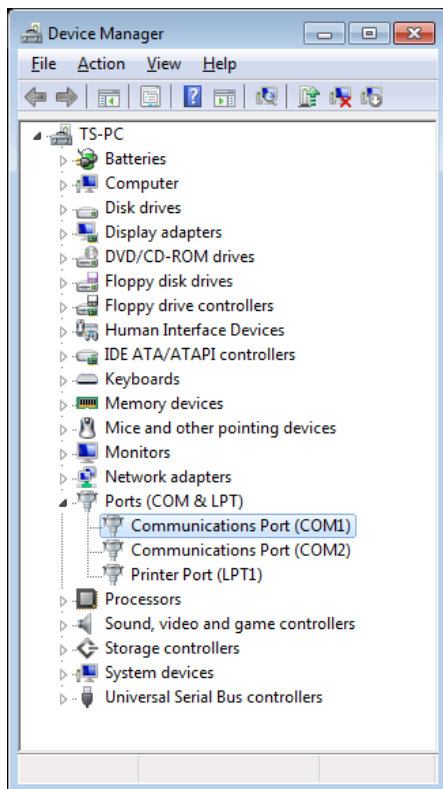


- 5 After the installation is complete, check that the GS.CPI.CMP150 folder and sub files are installed normally in the following path.

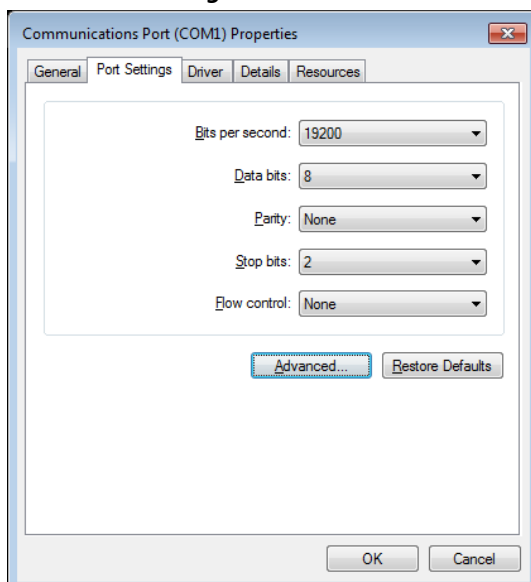
- C:\Program files\WVXvue\GENERATOR\Protocol\GS.CPI.CMP150\

### 3.15.2 How to Set Port from PC

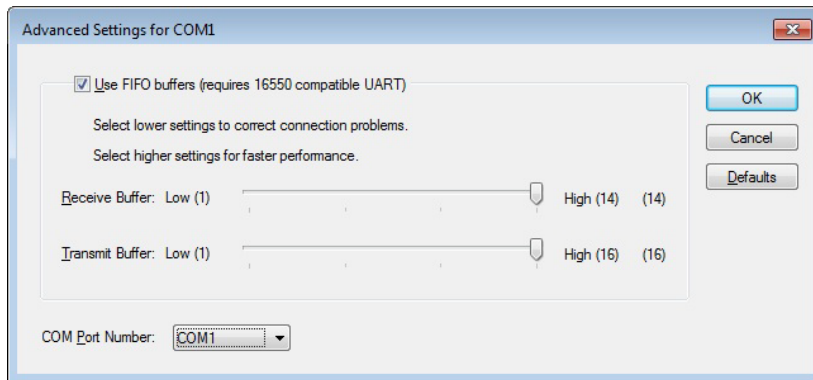
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.

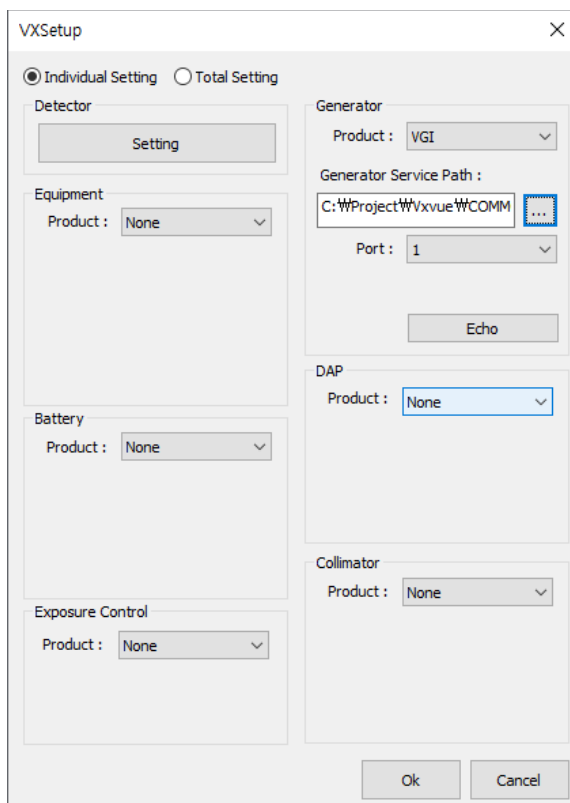


- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.15.3 How to Set CPI.CMP150 Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - Product: VGI
  - Port: COM port number configured from PC. (Refer to <3.15.2 How to Set Port from PC>)
- 3 Click  button and enter the path of GS.CPI.CMP150.exe (Generator Service) prepared in <3.15.1 How to Install GS>.
  - Ex.) C:\Program files\WVXvue\GENERATOR\Protocol\GS.CPI.CMP150\GS.CPI.CMP150.exe
- 4 Click the **Echo** button to check the connecting status.



5 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.

## VXvue



- The CPI.CMP150 generator is integrated with VXvue via VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

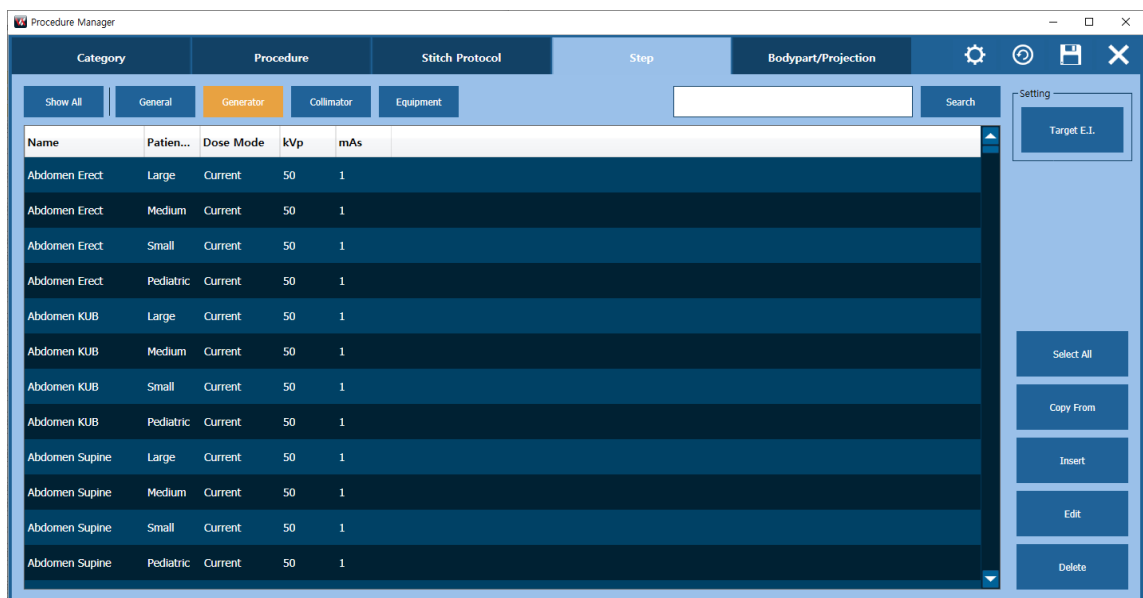
- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.15.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.15.5 How to Use CPI.CMP150 Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.


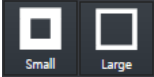
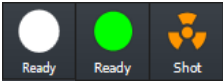



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)
- You can adjust **kVp** and **mAs**.


Items	Image
2 points	<div>70 kVp ▲ ▼</div> <div>20 mAs ▲ ▼</div>
	<div>200 mA ▲ ▼</div> <div>100 ms ▲ ▼</div>

### Icons

The inactive icons are not supported when the viewer program is integrated with the CPI.CMP150 generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	X-ray Status	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

### 3.15.6 Error and Warning Messages of CPI.CMP150 Generator

	<ul style="list-style-type: none"> <li>• Contact the manufacturer of generator if error or warning messages keep displaying even though you click the <b>Reset</b> button or reboot the generator.</li> </ul>
---	---

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

#### Error Message

Code	Error Message
1	Generator CPU EPROM checksum error
2	Generator CPU EEPROM data checksum error
3	Generator CPU NVRAM error

4	Generator CPU Real Time Clock error
5	Main Contactor error
6	Rotor Fault
7	Filament Fault
8	kV / mA Fault (previously known as Beam Fault)
9	Power Supply Not Ready
10	No KV during exposure
11	mA during exposure too high
12	mA during exposure too low
13	Manually Terminated Exposure
14	AEC Back-up Timer - Exposure Terminated
15	AEC MAS Exceeded - Exposure Terminated
16	Tomo Back-up Timer - Exposure Terminated
17	Uncalibrated Exposure Parameter
18	Preparation Time-out Error
19	Anode Heat Limit
20	Thermal Switch Interlock #1 Error
21	Thermal Switch Interlock #2 Error
22	Door Interlock Error
23	Collimator Interlock Error
24	Cassette Interlock Error
25	II Safety Interlock Error
26	Spare Input Interlock Error
27	Receptor Time-out Error - Receptor did not respond within time-out
28	Prep Input active during Initialization Phase
29	X-ray Input active during Initialization Phase
30	Fluoro Input active during Initialization Phase
31	Communication Error Remote Fluoro
32	Communication Error Console
33	Lithium Battery Low Voltage Error
34	+12VDC Error
35	-12VDC Error
36	+15VDC Error
37	-15VDC Error
38	Calibration Data Corrupt Error
39	AEC Data Corrupt Error
40	Fluoro Data Corrupt Error
41	Receptor Data Corrupt Error
42	Tube Data Corrupt Error
43	High Voltage Error - KV detected in non x-ray state
44	Invalid Communication Message

45	Communication Message Not Supported
46	Communication Message Not Allowed
47	Fluoro Timer Limit Error
48	Focus Mismatch Error
49	Not Enabled Error
50	Generator Limit Data Corrupt Error
51	AEC Feedback Error (No Feedback Signal Detected)
52	High Small Focus Filament Current Error in Standby
53	High Large Focus Filament Current Error in Standby
54	AEC Reference out of range
55	No Fields Selected in AEC mode1
56	No Tube Programmed
57	AEC Stop signal in wrong state
58	Console Back-Up Timer
59	Housing Heat Limit Exceeded
60	High KV Error
61	Low KV Error
62	EXP_SW signal active in standby state
63	Factory Defaults Enabled
64	No Exposure Release
65	Tomo Device Error
66	No Sync Pulse Input
67	Power Supply Duty Cycle Limit
70	Software Key Error
71	DAP Dose Overflow
72	DAP Device Error
73	DAP Data Error
74	Inverter 1 Error
75	Inverter 2 Error
76	Inverter 3 Error
77	Resonant Circuit Error
78	Bucky 1 Interlock
79	Bucky 2 Interlock
80	Interlock 1
81	Interlock 2
82	Overvoltage
83	Anode Overcurrent
84	Cathode Overcurrent
85	Main Rotor Fault
86	Shift Rotor Fault
91	Charger Fault

92	Wait For Charger
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
103	Calibration Error - Manually Terminated
104	Calibration Error - No mA
105	Calibration Error - Minimum mA not calibrated
150	Table Comm Error
151	Bucky Orientation Error
152	Table Error
153	Parameter Limit
154	Table Emergency Stop
160	Stand Not Ready
175	ACD Back Up Time Error

### Warning Message

Code	Error Message
200	Anode Warning Level Exceeded
201	Fluoro Timer Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit
211	Calibration Limit, Selected Parameter not Calibrated
212	Generator AEC Density Limit
213	Invalid Communication Parameter
214	Housing Heat Warning
215	CT Termination Input Wrong State
216	Deselect Tomo Table
217	Select Tomo Angle
218	Invalid Tomo Angle
219	Generator PPS Limit
220	Generator Power Supply Duty Cycle Warning
221	Generator Joule Limit
228	ACD Calibration Data Error
229	ACD Calibration Limit

<b>230</b>	DAP Not Ready
<b>231</b>	DAP Rate Warning
<b>232</b>	DAP Accum Warning
<b>234</b>	Wait For Cooling
<b>235</b>	DC Balance Error
<b>236</b>	Discharge Error
<b>237</b>	Input DC Error

## 3.16 SYFM

This section explains about the integration between **VXvue** and the **SYFM** generator model.

### Interlock Condition

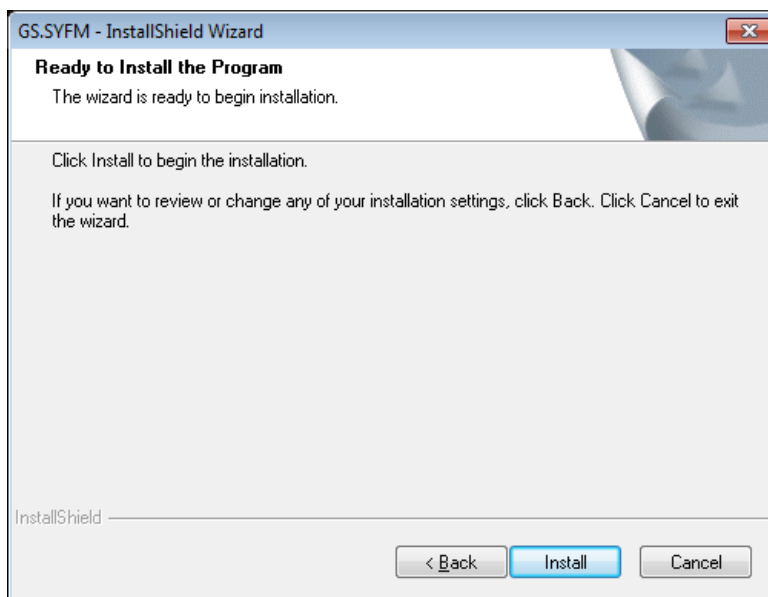
Complies with the communication standard of RS-232.

#### 3.16.1 How to Install GS

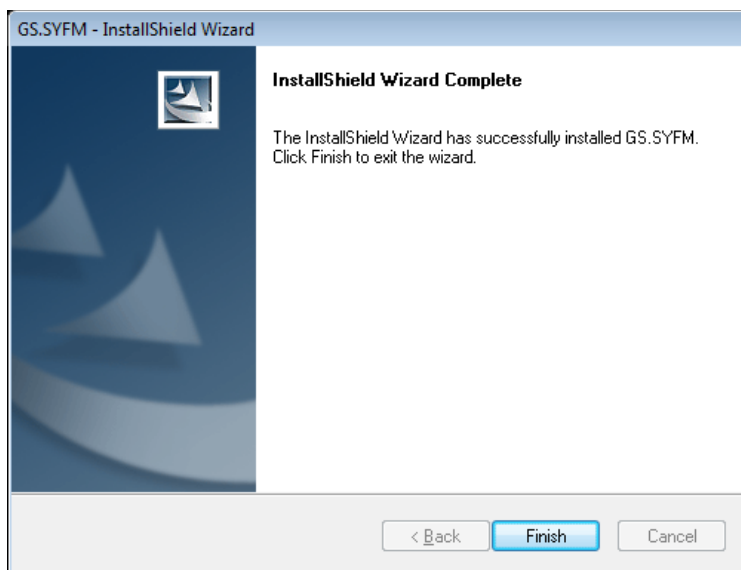


- To use **SYFM** generator, you must install **GS.SYFM.Setup.exe** separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install **VXvue**.
- 2 Run the GS.SYFM.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.

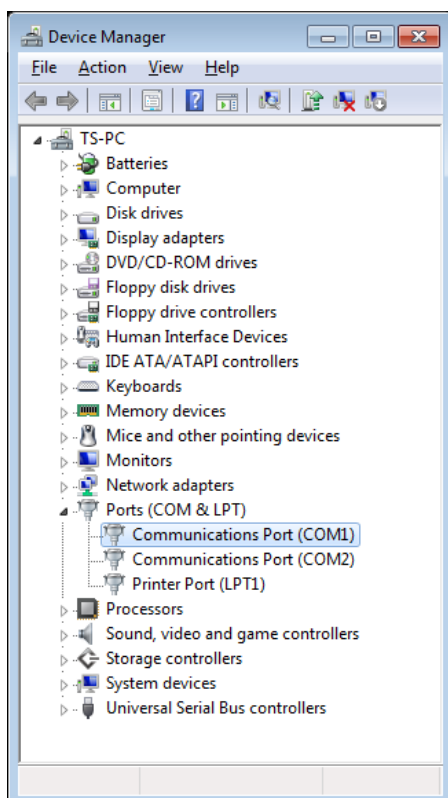


- 5 After the installation is complete, check that the GS.SYFM folder and sub files are installed normally in the following path.

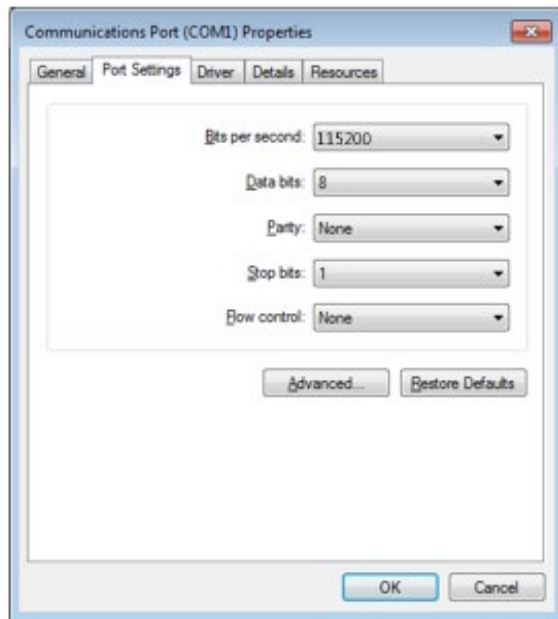
- C:\Program files\WVXvue\GENERATOR\Protocol\GS.SYFM\

### 3.16.2 How to Set Port from PC

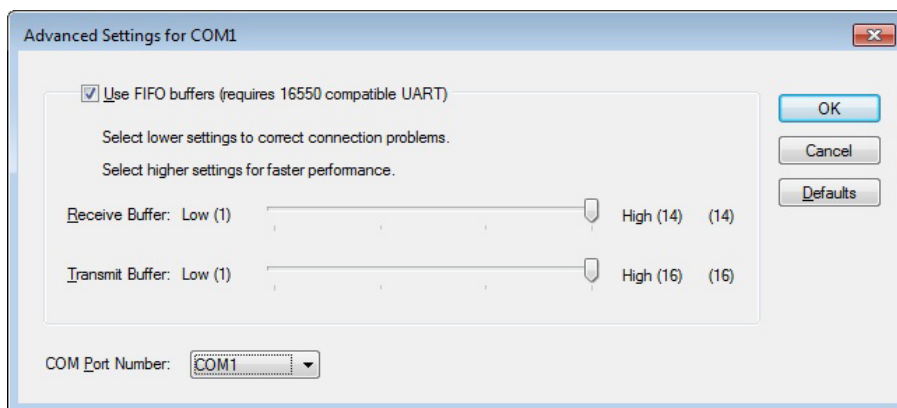
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port Number** to be used.




- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.16.3 How to Set SYFM Generator in VXSetup and VXvue

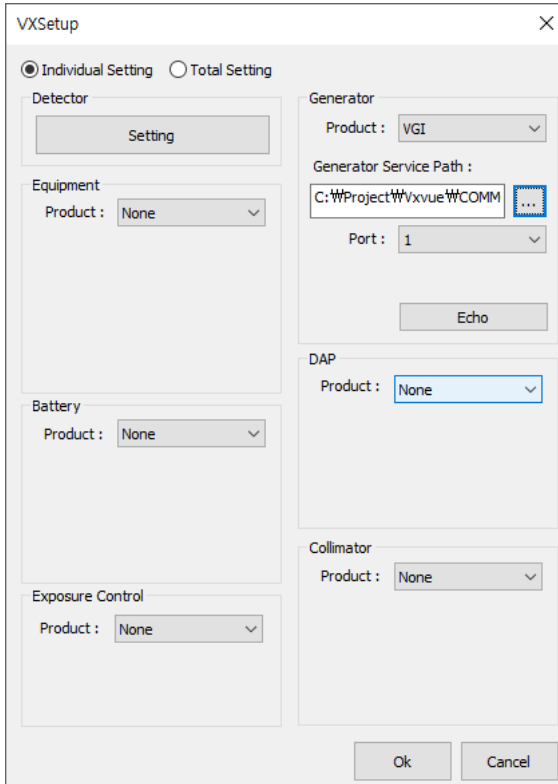
#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows.
  - Product: VGI
  - Port: COM port number configured from PC. (Refer to <3.16.2 How to Set Port from PC>)

- 3 Click  button and enter the path of GS.SYFM.exe (Generator Service) prepared in <3.16.1 How to Install GS>.

▫ Ex.) C:\Program files\WVXvue\GENERATOR\Protocol\GS.SYFM\GS.SYFM.exe

- 4 Click the Echo button to check the connecting status.



- 5 Click the **OK** button to save the settings.



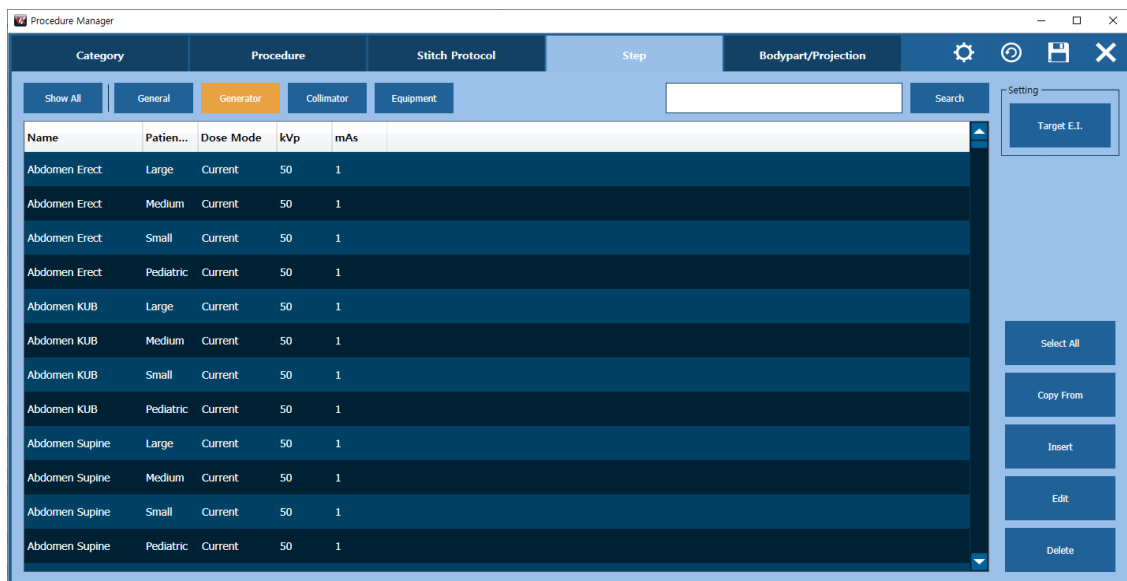
- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.



- The SYFM generator is integrated with VXvue via VGI.
- Refer to **<3.1.1 Generator Interlock setting>** for details on the generator's Integration method and Configuration file (xml).

### 3.16.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.16.5 How to Use SYFM Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.





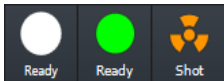

- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

- You can adjust **kVp** and **mAs**.


Items	Image							
2 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼

## Icons

The inactive icons are not supported when the viewer program is integrated with the **SYFM** generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	<b>Focal Spot Size (Small / Large)</b>	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>Ready (White) - Standby</li> <li>Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

### 3.16.6 Error and Warning Messages of SYFM Generator

	<ul style="list-style-type: none"> <li>Contact the manufacturer of generator if error or warning messages keep displaying even though you click the <b>Reset</b> button or reboot the generator.</li> </ul>
---	---

- Recoverable Error: The **Reset** button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

**Error Message**

Code	Error Message
4	kV_LIMIT_OVER_ERROR
5	mA_LIMIT_OVER_ERROR
8	XRAY_TIMEOVER_ERROR
9	NO_EXP_OK_SIGNAL_ERROR
10	OVER_CPU_ERROR
20	ALRAM_CPU_ERROR
30	MON_kV_OVER_ERROR
31	MON_kV_UNDER_ERROR
40	MON_mA_OVER_ERROR
41	MON_mA_UNDER_ERROR
50	MON_PRE_mA_OVER_ERROR
51	MON_PRE_mA_UNDER_ERROR
60	OP_COMM_ERROR
70	POWER_LEVEL_ERROR
90	DC_OUT_ERROR
100	EEPROM_TIMEOVER_ERROR
110	EEPROM_VALUE_ERROR
120	ULTRA_SOUND_ERROR
150	CALIBRATION_ERROR
200	MAX_POWER_OVER_ERROR
201	PRE_HEAT_OVER_ERROR

**Warning Message**

Code	Warning Message
7	READY_TIMEOVER_ERROR
25	TEMP_FB_CPU_ERROR
55	SET_mA_ERROR
56	SET_kV_ERROR
57	FB_START_ERR_ERROR
61	Rotor_Current_ERROR
80	TUBE_TEMP_ERROR

## 3.17 Ecoray

This section explains about the integration between **VXvue** and the **Ecoray** generator model.

### Interlock Condition

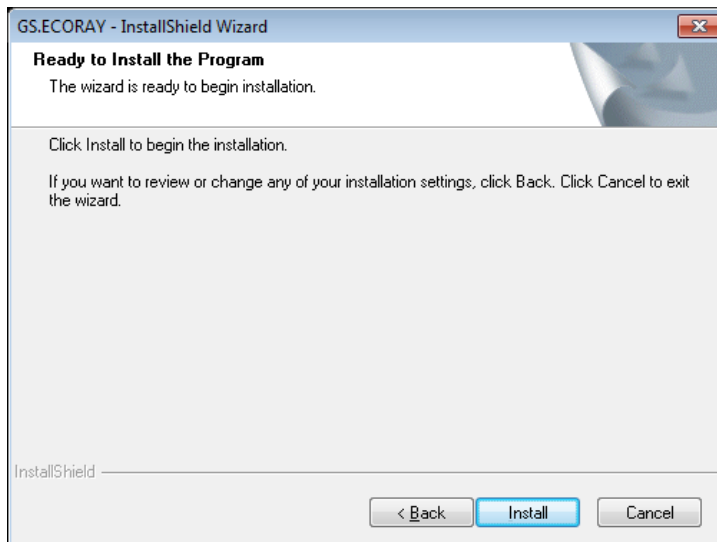
Complies with the communication standard of RS-232.

#### 3.17.1 How to Install GS

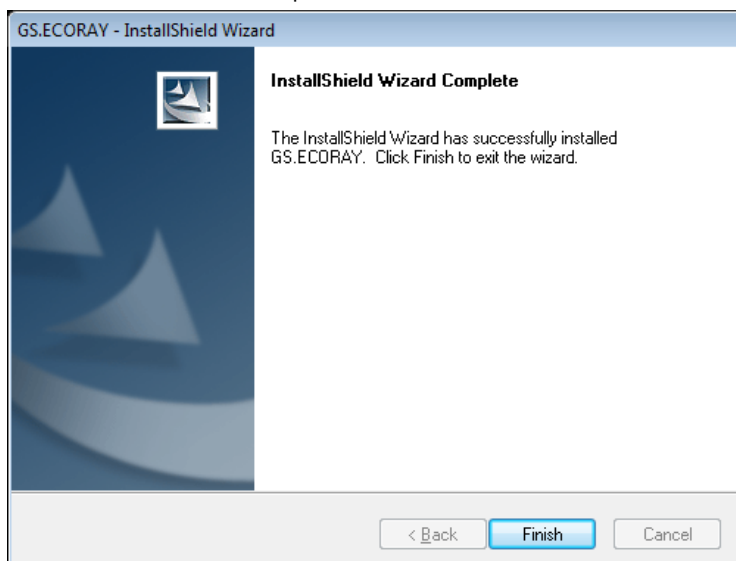


- To use Ecoray generator, you must install **GS.ECORAY.Setup.exe** separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install VXvue.
- 2 Run the GS.ECORAY.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.

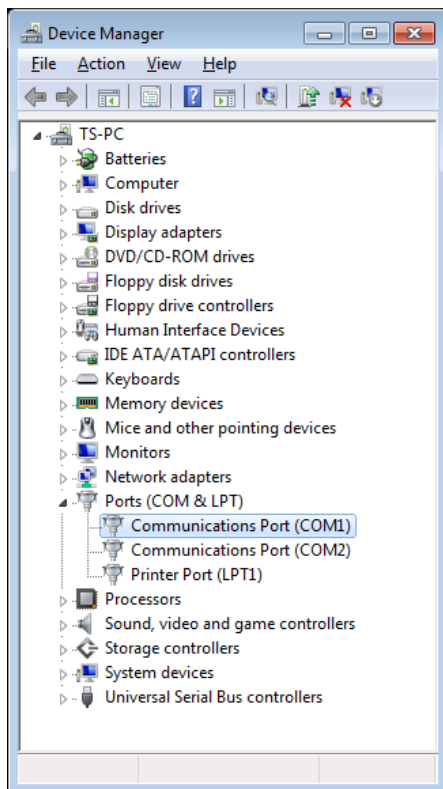


- 5 After the installation is complete, check that the GS.ECORAY folder and sub files are installed normally in the following path.

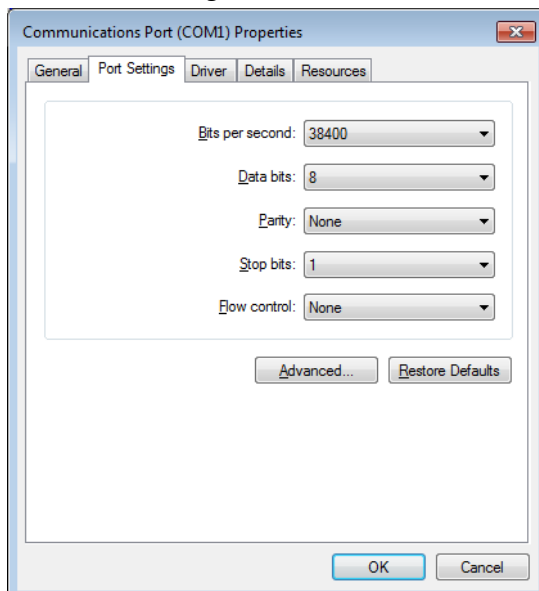
- C:\Program files\WVXvue\GENERATOR\Protocol\GS.ECORAY\

### 3.17.2 How to Set Port from PC

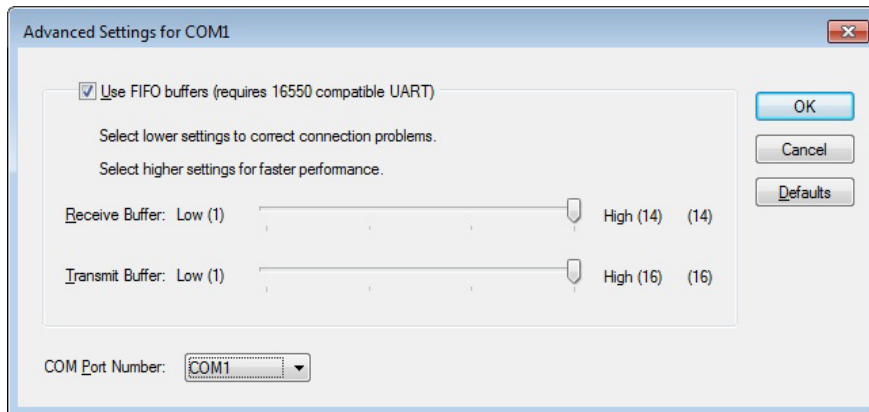
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the Communications **Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- Click the **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.17.3 How to Set Ecoray Generator in VXSetup and VXvue

#### VXSetup

- Run **VXSetup** and click the **Individual Setting** button.
- Set each item of the **Generator** menu as follows;
  - Product: VGI
  - Port: COM port number configured from PC. (Refer to <3.17.2 How to Set Port from PC>)
- Click  button and enter the path of GS.ECORAY.exe (Generator Service) prepared in <3.17.1 How to Install GS>.
  - Ex.) C:\Program files\WVXvue\WGENERATOR\WProtocol\WGS.ECORAY\WGS.ECORAY.exe

4 Click the **Echo** button to check the connecting status.

VXSetup

☒ Individual Setting ☐ Total Setting

**Detector**  
Setting

**Equipment**  
Product : None

**Battery**  
Product : None

**Exposure Control**  
Product : None

**Generator**  
Product : VGI  
Generator Service Path : C:\Project\Wxvue\WCOMM  
Port : 1  
Echo

**DAP**  
Product : None

**Collimator**  
Product : None

Ok Cancel

5 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.

## VXvue



- The Ecoray generator is integrated with VXvue via VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

## 3.17.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Procedure Manager

Category		Procedure		Stitch Protocol		Step		Bodypart/Projection		
Show All	General	Generator	Collimator	Equipment				Search		
Name	Patient...	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0

Setting

Target E.I.

Select All

Copy From

Insert

Edit

Delete



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.17.5 How to Use Ecoray Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

- You can use the following functions:
  - Using AEC
  - Adjusting kVp and mAs
  - Switching to adjust mA and ms, instead of mAs.

Item	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
AEC (Backup: ms)	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100


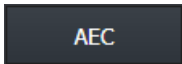



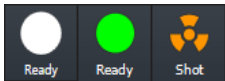



- The Ecoray Generator supports AEC Backup mode, which allows you to set the maximum threshold at which ms is triggered when shooting in AEC mode.
  - ms: Sets the maximum limit of ms required when shooting in AEC mode.
- Contact your generator manufacturer, ECORAY, to find out how to set backup values in AEC Backup mode.

#### Icons

The inactive icons are not supported when the viewer program is integrated with the **Ecoray** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode to adjust <b>kVp</b> and <b>mAs</b> .


	<b>mA/ms</b>	Enable to use 3 points mode to adjust <b>kVp, mA, ms</b> .
	<b>AEC</b>	Enable to use AEC functions.
	<b>AEC Field (Left / Center / Right)</b>	Select an AEC field to use. <ul style="list-style-type: none"> <li>• Default setting: Center</li> <li>• Enable to select multiple AEC fields.</li> </ul>
	<b>Density</b>	Enable to adjust the density of AEC.
	<b>Reset</b>	The <b>Reset</b> icon is activated and an error message is indicated when a soluble error occurs by resetting the system. Click the icon at this time to start reset.
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b> .	

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.17.6 Error and Warning Messages of Ecoray Generator

	• Contact the manufacturer of generator if error or warning messages keep displaying even though you click the <b>Reset</b> button or reboot the generator.
---	---

Recoverable Error: The **Reset** button becomes activated. Click this button for troubleshooting.

### Error Message

Code	Error Message
1	Charge Error
2	Change Feedback Error
3	Tube Temp Error
4	Door Error

<b>5</b>	Interlock Error
<b>6</b>	HVDOLP Error
<b>7</b>	HCTOLP Error
<b>8</b>	FLMOLP Error
<b>9</b>	SPSOLP Error
<b>10</b>	Filament Error
<b>11</b>	Rotor Error
<b>12</b>	AEC Error

### 3.18 Sedecal.SHFR

This section explains about the integration between **VXvue** and the **Sedecal.SHFR** generator model.

#### Interlock Condition

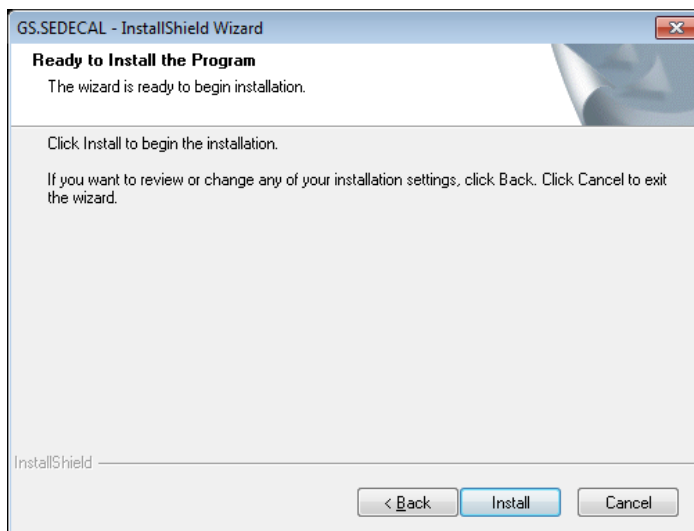
Complies with the communication standard of RS-232.

#### 3.18.1 How to Install GS

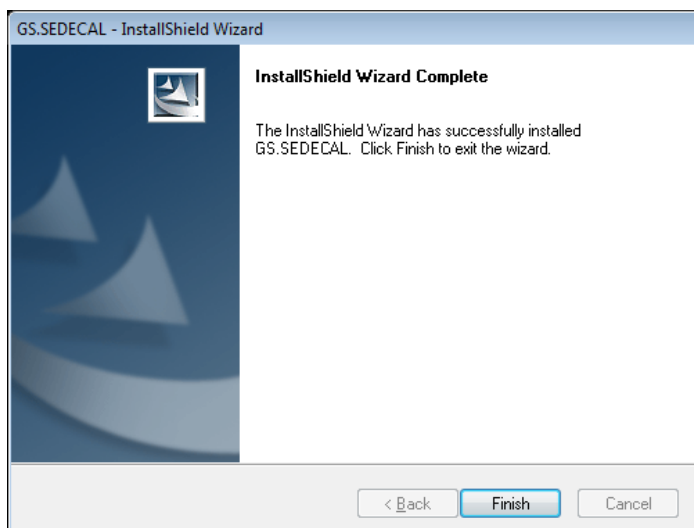


- To use **Sedecal.SHFR** generator, you must install **GS.SEDECAL.Setup.exe** separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install VXvue.
- 2 Run the GS.SEDECAL.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.

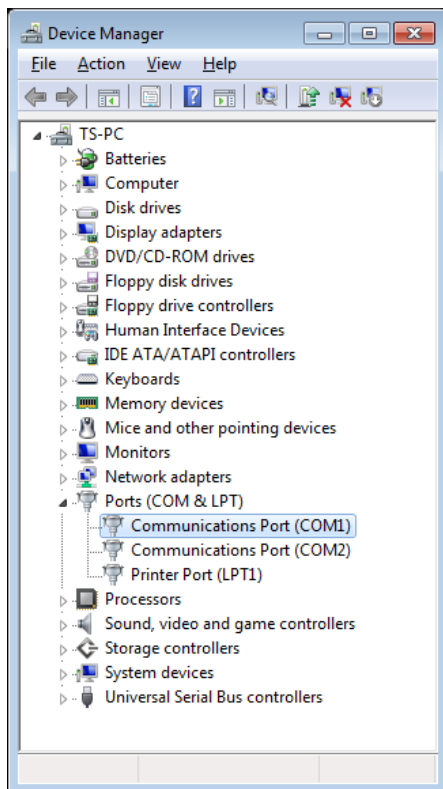


- 5 After the installation is complete, check that the GS.SEDECAL folder and sub files are installed normally in the following path.

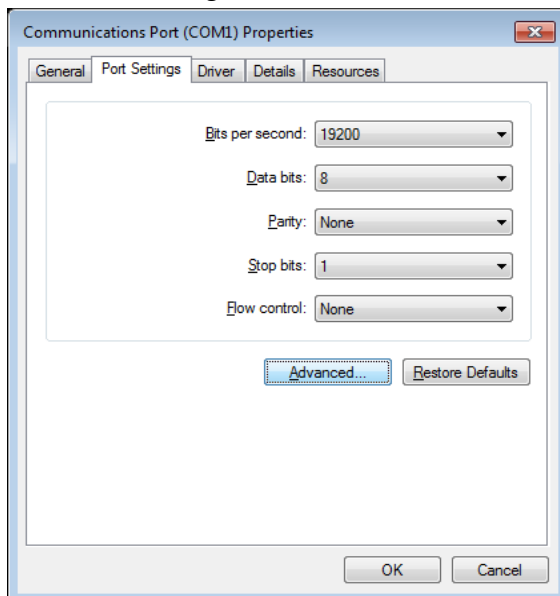
- C:\Program files\WVXvue\GENERATOR\Protocol\GS.SEDECAL\

### 3.18.2 How to Set Port from PC

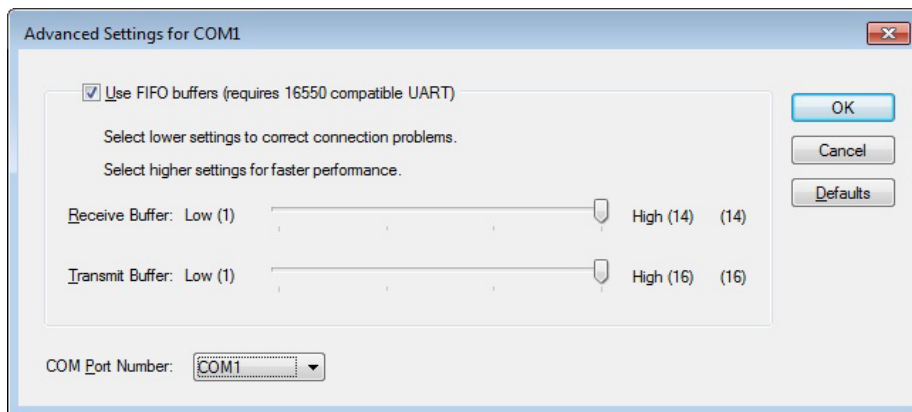
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.18.3 How to Set Sedecal.SHFR Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the Generator menu as follows.
  - Product: VGI
  - Port: COM port number configured from PC. (Refer to <3.18.2 How to Set Port from PC>)
- 3 Click  button and enter the path of GS.SEDECAL.exe (Generator Service) prepared in <3.18.1 How to Install GS>.
  - Ex.) C:\Program files\WVXvue\WGENERATOR\WProtocol\WGS.SEDECAL\WGS.SEDECAL.exe

4 Click the **Echo** button to check the connecting status.

VXSetup

☒ Individual Setting ☐ Total Setting

Detector  
Setting

Equipment  
Product : None

Battery  
Product : None

Exposure Control  
Product : None

Generator  
Product : VGI  
Generator Service Path : C:\Project\Wxvue\WCOMM  
Port : 1  
Echo

DAP  
Product : None

Collimator  
Product : None

Ok Cancel

5 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.

**VXvue**

- The Sedecal.SHFR generator is integrated with VXvue via VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

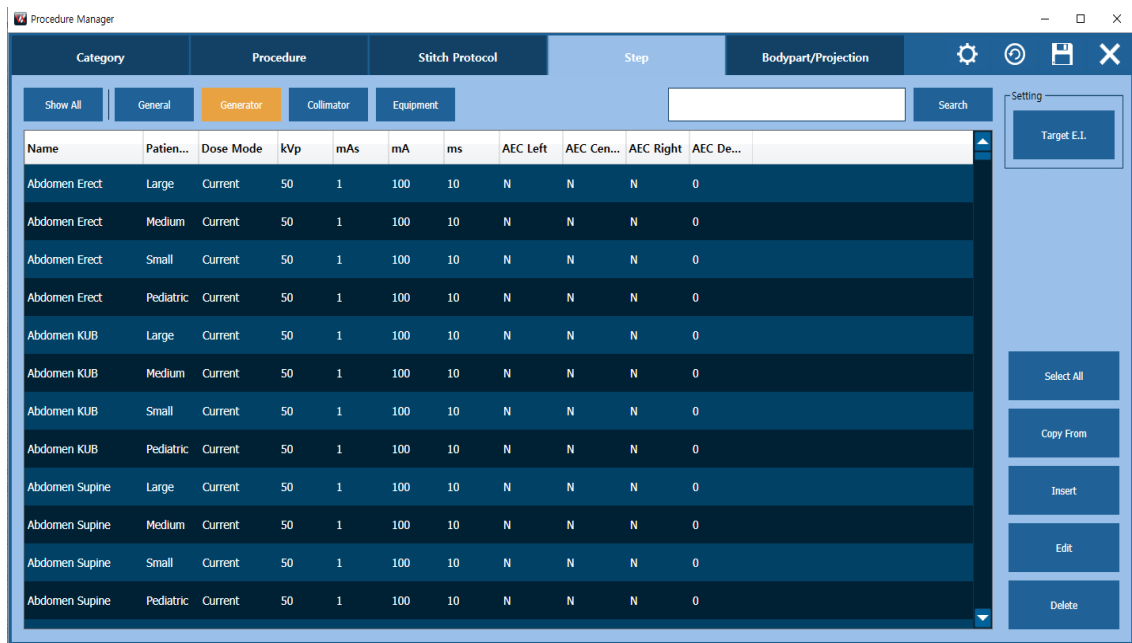
- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

**3.18.4 How to Set Generator in Procedure Manager in VXvue**

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
 ▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.18.5 How to Use Sedecal.SHFR Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**. Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

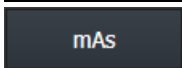
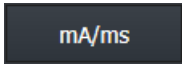




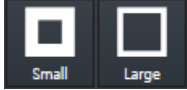
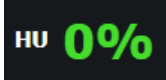


- You can use the following functions:
  - Using AEC
  - Adjusting kVp and mAs
  - Switching to adjust mA and ms, instead of mAs.

Item	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
AEC	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼

## Icons

The inactive icons are not supported when the viewer program is integrated with the **Sedecal.SHFR** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode to adjust <b>kVp</b> and <b>mAs</b> .
	mA/ms	Enable to use 3 points mode to adjust <b>kVp</b> , <b>mA</b> , <b>ms</b> .
	AEC	Enable to use AEC functions.
	AEC Field (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>• Default setting: Center</li> <li>• Enable to select multiple AEC fields.</li> </ul>
	Density	Enable to adjust the density of AEC.
	Film / Screen	Enable to set film and screen (sensitivity) of AEC. <ul style="list-style-type: none"> <li>• <b>Slow, Normal, Fast</b></li> </ul>
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• <math>0 &lt; HU \leq 50</math>: Green</li> <li>• <math>50 &lt; HU \leq 80</math>: Yellow</li> <li>• <math>80 &lt; HU</math>: Red</li> </ul>
	Reset	The <b>Reset</b> icon is activated and an error message is indicated when a soluble error occurs by resetting the system. Click the icon at this time to start reset.
	X-ray Status	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> </ul>

- Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.18.6 Error and Warning Messages of Sedecal.SHFR Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Message

Code	Error Message
1	BACKUP TIMER - I2C ERROR
2	WRONG WS CONFIGURATION ERROR
3	WS CONFIGURED ERROR
4	FLUORO ORDER ERROR
5	EXP ORDER ERROR
6	PREP ORDER ERROR
7	TUBE2 MODEL ERROR
8	TUBE1 MODEL ERROR
9	INVERTER ERROR (IGBT FAULT)
10	EEPROM CHECK ERROR
11	LOAD CAPACITOR ERROR
12	MA RANGE ERROR
13	KVP RANGE ERROR
14	KVP RAMP ERROR
15	LARGE FIL CURRENT RANGE ERROR
16	SMALL FIL CURRENT RANGE ERROR
18	ROTOR ERROR
19	MA WITHOUT EXP ERROR
20	KVP WITHOUT EXP ERROR

23	EEPROM ERROR
24	BUCKY / DIGITAL PANEL ERROR
25	LARGE FIL DEMAND ERROR
26	SMALL FIL DEMAND ERROR
27	KVP POTENTIOMETER - I2C ERROR
28	ABC POTENTIOMETER - I2C ERROR
30	CORRUPT RTC ERROR
31	TIME STAMP CHECK ERROR
32	RTC - I2C ERROR
33	COMMUNICATIONS ERROR (Comms lost at the Console)
34	TANK PRESOSTAT ERROR
35	BUCKY MOTION (XRAY ACK) ERROR
38	+5V POWER SUPPLY FAILURE
39	+15V POWER SUPPLY FAILURE
40	IMBALANCED KVP ERROR
41	IMBALANCED MA ERROR
42	CORRUPT COUNTERS ERROR
43	CORRUPT ERROR LOG ERROR
44	CORRUPT COUNTERS ERROR
45	CORRUPT TUBE DATA ERROR
46	BUSY BUS - I2C ERROR
47	LICENCE - I2C ERROR
48	DOOR ABORTED EXPOSURE
49	COMMUNICATIONS ERROR (Comms lost at the generator)
50	ABORTED EXPOSURE ERROR
51	WRONG EXPOSURE TIME ERROR
53	FLUORO SYNC ERROR
54	DIGITAL SYNC ERROR
55	NOT ENOUGH DOSE ERROR
56	NOT ENOUGH BACKUP TIME ERROR
57	DUAL ENERGY ERROR
58	TUBE1 DATA ERROR
59	TUBE2 DATA ERROR
60	AUTOCAL ERROR
61	LICENCE ERROR
62	AEC ERROR
63	ROTOR READY ERROR
64	TANK FEEDBACK ERROR
65	+24V DELAYED POWER SUPPLY FAILURE
66	+24V (UNR) POWER SUPPLY FAILURE
67	-15V POWER SUPPLY FAILURE

68	+3.3V POWER SUPPLY FAILURE
69	+24 PERMANENT (UNR) POWER SUPPLY FAILURE
70	AEC RAPID TERMINATION
71	INTERLOCK ERROR
72	POSITIONER OK ERROR
73	XON FEEDBACK ERROR
74	COP GENERATOR RESET ERROR
75	CLK GENERATOR RESET ERROR
76	TRAP GENERATOR RESET ERROR
77	SOFTWARE INTERRUPT GENERATOR RESET ERROR
78	MEMORY OVERFLOW INTERRUPT GENERATOR RESET ERROR
79	REQUIRED MA STATIONS CAL ERROR
91	HEARTBEAT ERROR (R2CP Protocol)
99	INCORRECT MESSAGE
101	NONE SPEED AVAILABLE
102	LOW SPEED UNAVAILABLE
103	HIGH SPEED UNAVAILABLE
104	DOSIMETER TUBE 1 NO ANSWER ERROR
105	DOSIMETER TUBE 1 TEST ERROR
106	DOSIMETER TUBE 1 STATUS ERROR
107	DOSIMETER TUBE 2 NO ANSWER ERROR
108	DOSIMETER TUBE 2 TEST ERROR
109	DOSIMETER TUBE 2 STATUS ERROR
125	ROM Test Error
126	Instructions Test Error
127	Internal RAM Test
128	External RAM Test
129	Initialization Error
130	CAN WATCHDOG
131	ADC TEST
132	BOOSTER CURRENT TEST
133	CAN CONTROLLER INITIALIZATION
134	MICROCONTROLLER POWER SUPPLY
136	+15V POWER SUPPLY
137	BOOSTER ERROR
138	Starter Inverter Error
139	Inverter Failure
140	Output Voltage
141	uController Watchdog
142	Input Current
143	Input Voltage

144	MAIN Current
145	AUX Current
146	Tube Code or Number
147	TUBE CONNECTION
148	TUBE DEFINITION
149	Booster disabled
150	Master Synchronism
151	Initial Test
152	Starter Test
153	Booster Overvoltage
154	Booster Overcurrent
155	Booster Shortcut
156	Rotor Between Measure
157	Timeout during Brake
158	Timeout Stop to HS
159	Timeout LS to HS
160	Timeout HS to LS
161	Timeout Stop to LS
162	Timeout HS to Stop
163	Timeout LS to Stop
164	Starter Test
165	-5V Power Supply
166	Booster Demand
168	1st Pulse PWM Warning
169	Linear PWM Warning
170	Command Rejected
171	Resources Error
172	Software Error
173	CAN Initialization
174	CAN STUFF (Wiring)
175	CAN FORM
176	CAN ACK
177	CAN BIT1
178	CAN BIT0
179	CAN CRC
180	CAN INIT ID
181	CAN BUS OFF
182	CAN EWARN
183	CAN Object out of range
184	CAN Object not used
185	CAN Object mismatch

186	CAN Buffer full
187	CAN Slave out of range
188	CAN Config Param
189	CAN FORM message
190	CAN Config Modif Obj 1
191	CAN Config Modif Obj 2
192	CAN Config Modif Obj 3
193	CAN Config Modif Obj 4
194	CAN Config Modif Obj 5
195	CAN Config Modif Obj 6
196	CAN Config Modif Obj 7
197	CAN Config Modif Obj 8
198	CAN Config Modif Obj 9
199	CAN Config Modif Obj 10
200	CAN Config Modif Obj 11
201	CAN Config Modif Obj 12
202	CAN Config Modif Obj 13
203	CAN Config Modif Obj 14
204	CAN Config Modif Obj 15
205	Timer: Null Function
206	Timers Errors : Timer 0
207	Timers Errors : Timer 1
209	Timers Errors : Timer 2
213	Timers Errors : PCA
221	Timer: SLY Functions
222	Timer: SLY Functions
238	STARTER NOT RESPONDING ERROR
239	STARTER OVERLOAD ERROR
240	STARTER TUBE INDEX ERROR

### Warning Message

Code	Warning Message
1	Generator power limit
2	Tube power limit
3	Space charge limit
4	kVp range limit
5	mAs range limit

6	mA range limit
7	ms range limit
8	Focus change inhibit
9	Wrong APR Technique
10	Inverter load limit
12	Wrong APR workstation
13	PPS range limit
29	GENERATOR OVERHEAT ERROR
36	TUBE THERMOSTAT ERROR;
37	TUBE OVERLOAD ERROR

### 3.19 GXR 52

This chapter describes the integration between VXvue and GXR 52 generator model through DRGEM's SDK tool, **GXR\_SDK\_10630.exe**.

#### Interlock Condition

GXR 52 generator can be integrated with VXvue via Software Driven, which communicates via VXvue (viewer) and GXR generator console software. To integrate VXvue and GXR generator, install the GXR Generator console software first and check that it works properly.

- After installing the GXR generator console software, connect the PC and the generator cable (RS-232C).

#### Integrated Models

- **GXR 52**
- Supports **GXR SDK 1.06.30**



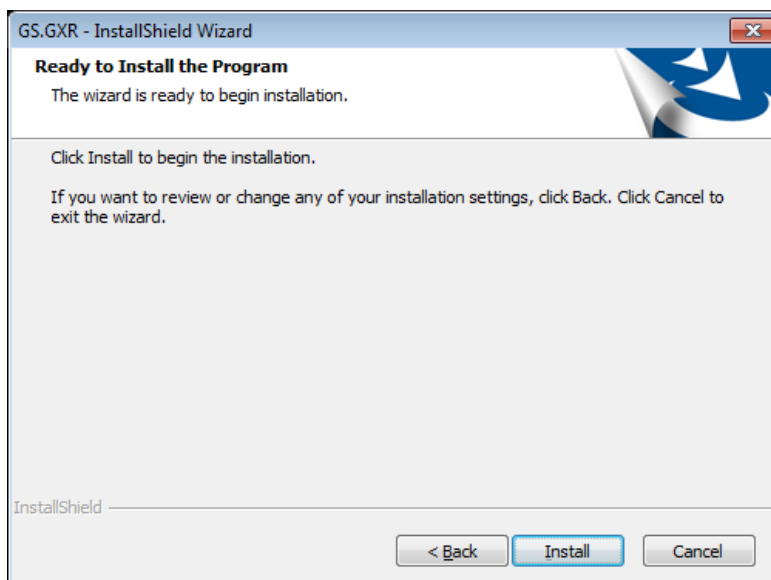
- Models other than DRGEM Generator GXR 52 may not be interlocked depending on the specifications.
- The generator can malfunction if the integrated SDK version is different.

#### 3.19.1 How to Install GS

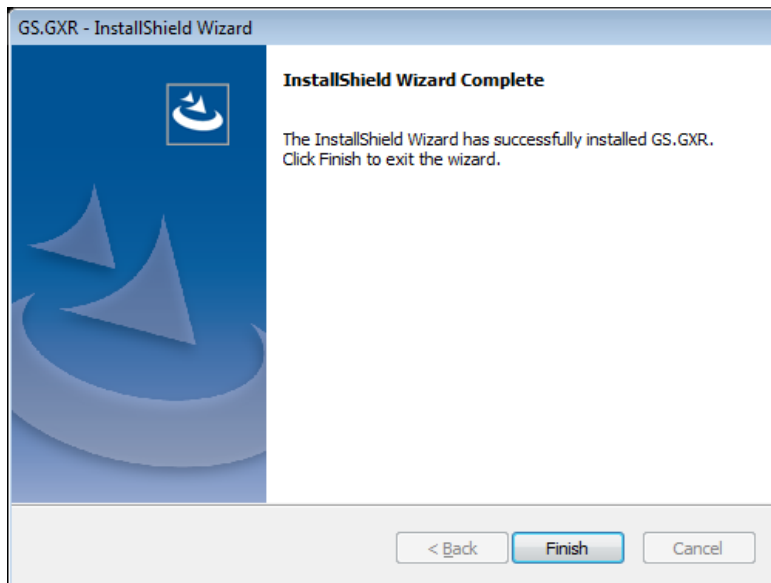


- To use GXR **52** generator, you must install **GS.GXR.Setup.exe** separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install VXvue.
- 2 Run the GS.GXR.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.




- 4 When the installation is complete, click the **Finish** button.

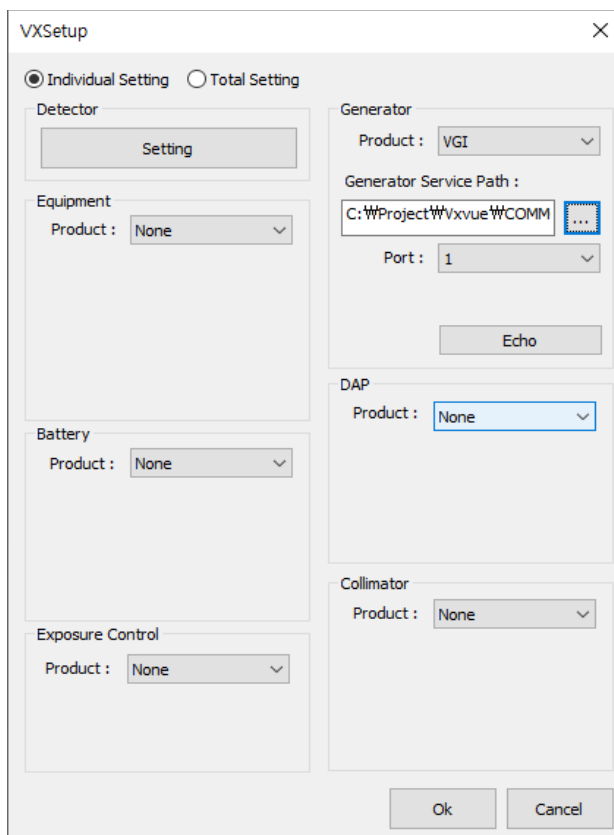


- 5 After the installation is complete, check that the GS.GXR folder and sub files are installed normally in the following path.
  - C:\Program files\WXvue\GENERATOR\Protocol\GS.GXR\

### 3.19.2 How to Set GXR 52 Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - Product: VGI
- 3 Click  button and enter the path of GS.GXR.exe (Generator Service) prepared in <3.19.1 How to Install GS>.
  - Ex.) C:\Program files\WXvue\GENERATOR\Protocol\GS.GXR\GS.GXR.exe
- 4 Click the **Echo** button to check the connecting status.



5 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.

## VXvue



- The GXR 52 generator is integrated with VXvue via VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.19.3 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
 ▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose Dose Mode / kVp / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.19.4 How to Use GXR 52 Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.




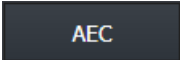



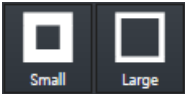


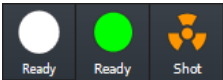
- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

- You can use the following functions:
  - Using AEC
  - Adjusting kVpm, mA and ms

Item	Image					
3 points	70	kVp	▲	▼	20	mAs
	200	mA	▲	▼	100	ms
AEC	70	kVp	▲	▼	20	mAs
	200	mA	▲	▼	100	ms

## Icons

The inactive icons are not supported when the viewer program is integrated with the **GXR 52** generator.

Icon	Name	Description
	<b>mA/ms</b>	Enable to use 3 points mode to adjust <b>kVp</b> , <b>mA</b> and <b>ms</b> .
	<b>AEC</b>	Enable to use AEC functions.
	<b>AEC Field</b> (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>Default setting: Center</li> <li>Enable to select multiple AEC fields.</li> </ul>
	<b>Density</b>	Enable to adjust the density of AEC.
	<b>Film / Screen</b>	Enable to set film and screen (sensitivity) of AEC. <b>Slow, Normal, Fast</b>
	<b>Focal Spot Size</b> (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>Heat Units (Anode)</b>	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>0&lt;HU≤50: Green</li> <li>50&lt;HU≤80: Yellow</li> <li>80&lt;HU: Red</li> </ul>
	<b>Reset</b>	The <b>Reset</b> icon is activated, and an error message is indicated when a soluble error occurs by resetting the system. Click the icon at this time to start reset.
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li><b>Ready</b> (White) - Standby</li> </ul>

- **Ready** (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.
- **Shot** (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.19.5 Error and Warning Messages of GXR.52 Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Message

Code	Error Message
1	TXRX NO ANSWER
2	NVSRAM FAIL ERROR
3	CHARGE ERROR
4	IGBT1 FAULT
5	IGBT2 FAULT
6	TUBE TEMPERATURE
7	FAULT SENSING ERROR
8	NVSRAM PARA ERROR
9	TXRX0 NO ANSWER
16	OVER MA - HARDWARE
17	OVER KV - HARDWARE
18	KV INEQUALITY 1
19	KV INEQUALITY 2
20	CAL DATA EMPTY
21	FIL1 SELECT ERROR
22	FIL2 SELECT ERROR

23	OVER MA - SOFTWARE
24	HEAT UNIT ERROR
25	ROTOR ACCEL CURRENT LOW ERROR
32	ROTOR RUNNING CURRENT LOW ERROR
33	DSS IPM FAULT
34	ROTOR ACCEL CURRENT HIGH ERROR
35	ROTOR RUNNING CURRENT HIGH ERROR
36	DSS UNDER VOLTAGE ERROR
37	DSS HARDWARE ERROR
38	DSS SPEED SELECT ERROR
39	AEC RAMP ERROR
40	AEC INT ERROR
41	AEC MAS ERROR
48	AEC BUT ERROR
49	DR READY SET
50	TOMO SET ERROR
51	BUCKY1 FEEDBACK ERROR
52	BUCKY2 FEEDBACK ERROR
53	CHARGE. MC. FAIL ERROR
54	EXT. MC. FAIL ERROR
55	MAIN MC. FAIL ERROR
56	NO kV ERROR
57	NO mA ERROR
64	FIL PREHEAT LOW
65	FIL PREHEAT HIGH
66	FIL READY LOW
67	FIL READY HIGH
68	FIL_SMALL ERROR
69	FIL_LARGE ERROR
70	DOOR INTERLOCK
71	EXT INTERLOCK
72	HT TXRX NO ANSWER
73	AEC DATA EMPTY
80	ROTOR BRAKE FAIL ERROR
81	CHARGER UNDER VOLTAGE ERROR
82	CHARGER OVER VOLTAGE ERROR
83	CHARGER UNDER CURRENT ERROR
84	CHARGER OVER CURRENT ERROR
85	CMB OVER VOLTAGE ERROR
86	BATTERY EMPTY ERROR
87	CHARGER FAIL ERROR

88	INV. MC FAIL ERROR
89	INV. IPM FAULT ERROR

**Warning Message**

Code	Warning Message
80	kV Low - Software
81	kV High - Software
82	mA Low - Software
83	mA High - Software
84	HU Warning Level break;
85	Tube Overload
86	NVSRAM RTC Fail
89	Rotor Duty Limit
96	CRC Fail
97	VDC Low Level
98	SMPS Low Voltage
99	Exp. Switch Release
100	kV Feedback Abnormal
101	mA Feedback Abnormal
102	NVSRAM Initialize
103	TX FIFO Overflow
104	HT CRC Fail
113	Maximum kV
112	Minimum kV
115	Maximum mA
114	Minimum mA
116	Minimum Exp. Time
117	Maximum Exp. Time
118	Minimum Density
119	Maximum Density
120	CONSOLE RX Overflow
121	CONSOLE TX Overflow
128	Minimum mAs
129	Maximum mAs
130	Max. Output Rating
131	AEC is Unavailable
132	USB RX FIFO Overflow
133	USB Connection Fail
134	USB CRC Fail
135	USB TX Fail
137	APR Data Fail

144	CMB Over Voltage
145	Inverter under current
146	Inverter over current
147	Inverter over voltage
148	Inverter under voltage
149	Battery charge low
150	Exp. Time Over

### 3.20 Spellman.ZEUS

This section explains about the integration between **VXvue** and the **Spellman.ZEUS** generator model.

#### Interlock Condition

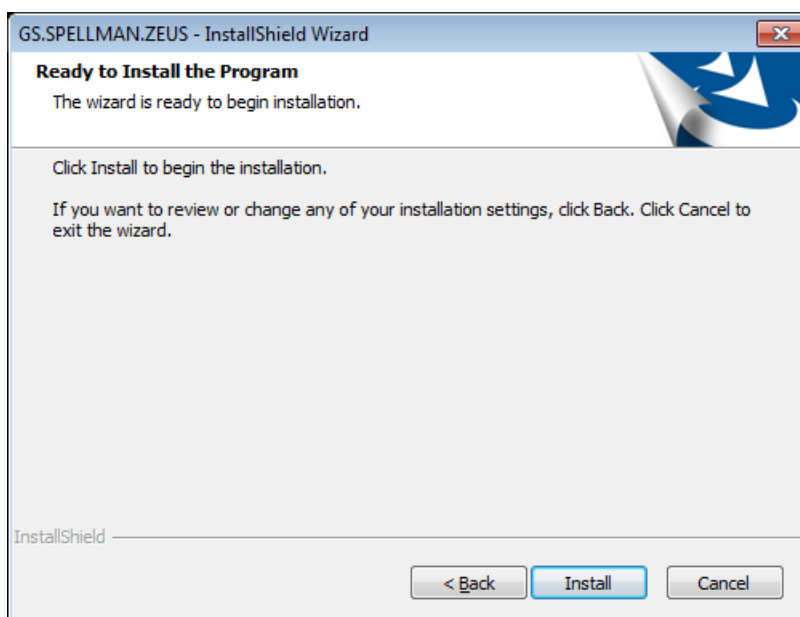
Complies with the communication standard of RS-232.

#### 3.20.1 How to Install GS

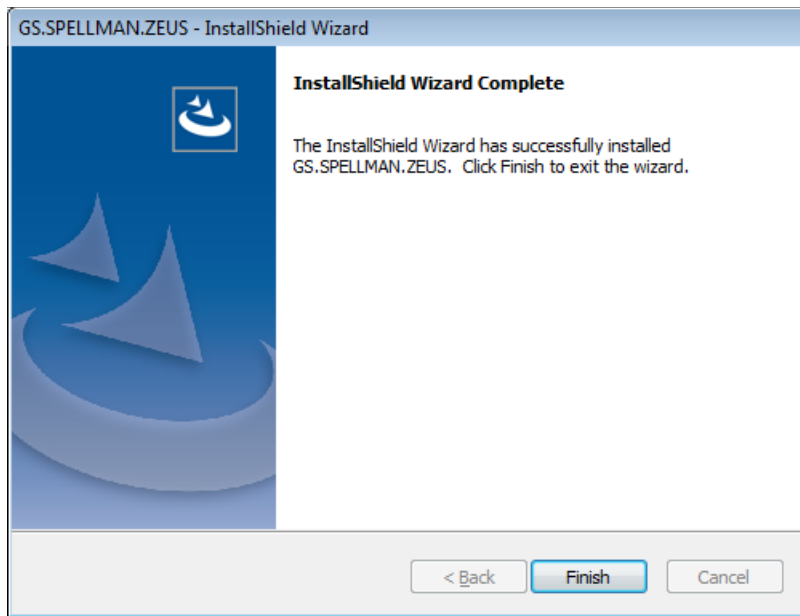


- To use **Spellman.ZEUS** generator, you must install **GS.SPELLMAN.ZEUS.Setup.exe** separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install VXvue.
- 2 Run the GS.SPELLMAN.ZEUS.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.

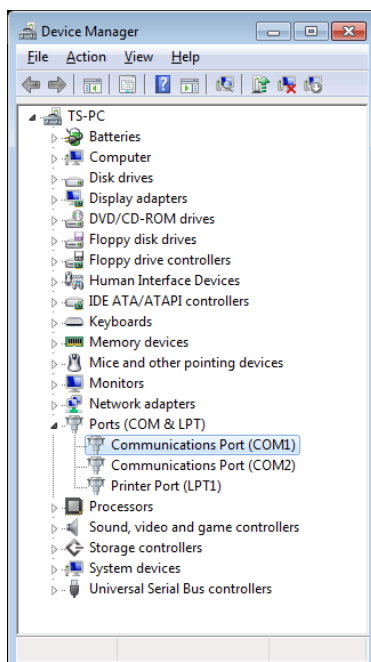


- 5 After the installation is complete, check that the GS.SPELLMAN.ZEUS folder and sub files are installed normally in the following path.

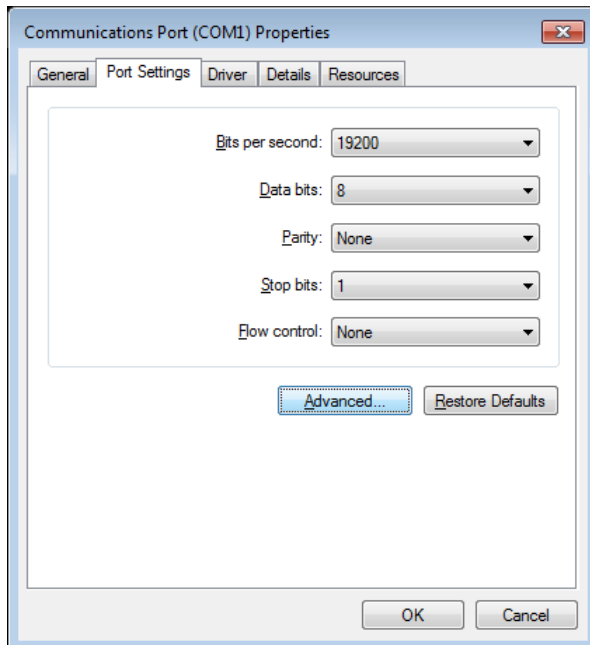
- C:\Program files\WVXvue\GENERATOR\Protocol\GS.SPELLMAN.ZEUS\

### 3.20.2 How to Set Port from PC

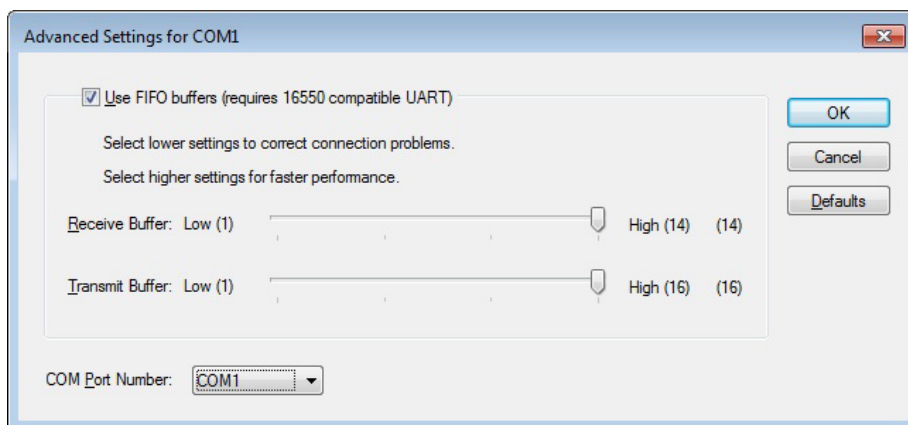
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



4 Click the **OK** button after appointing **COM Port Number** to be used.




- Input or choose the configured COM port number when making settings about the generator in VXSetup.

### 3.20.3 How to Set Spellman.ZEUS Generator in VXSetup and VXvue

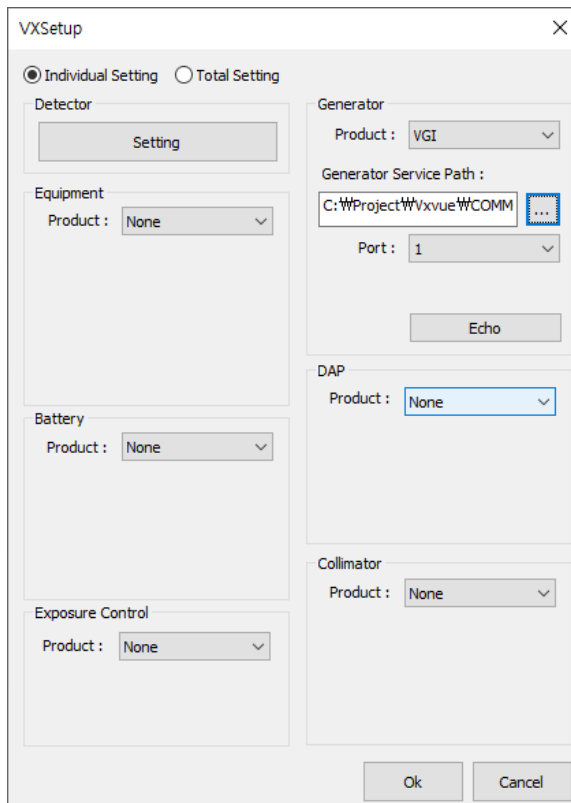
#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: VGI
  - Port: COM port number configured from PC. (Refer to <3.20.2 How to Set Port from PC>)

- 3 Click  button and enter the path of GS.SPELLMAN.ZEUS.exe (Generator Service) prepared in <3.20.1 How to Install GS>.

▫ Ex.) C:\Program files\WVXvue\GENERATOR\Protocol\GS.SPELLMAN.ZEUS\GS.SPELLMAN.ZEUS.exe

- 4 Click the **Echo** button to check the connecting status.



- 5 Click the **OK** button to save the settings.



- Before you set items of generator in VXSetup, check if the generator is connected to the generator module box with a cable (RS-232c) normally.

## VXvue



- The Spellman.ZEUS generator is integrated with VXvue via VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.20.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.20.5 How to Use Spellman.ZEUS Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (port, etc.)

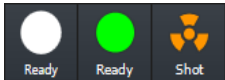
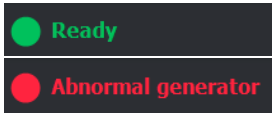

- You can use the following functions:
  - Using AEC
  - Adjusting kVp and mAs
  - Switching to adjust mA and ms, instead of mAs.

Item	Image							
2 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
AEC	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼

## Icons

The inactive icons are not supported when the viewer program is integrated with the **Spellman.ZEUS** generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode to adjust <b>kVp</b> and <b>mAs</b> .
	mA/ms	Enable to use 3 points mode to adjust <b>kVp</b> , <b>mA</b> , <b>ms</b> .
	AEC	Enable to use AEC functions.
	AEC Field (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>• Default setting: Center</li> <li>• Enable to select multiple AEC fields.</li> </ul>
	Density	Enable to adjust the density of AEC.
	Film / Screen	Enable to set film and screen (sensitivity) of AEC. <ul style="list-style-type: none"> <li>• <b>Slow, Normal, Fast</b></li> </ul>
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• <math>0 &lt; HU \leq 50</math>: Green</li> </ul>

		<ul style="list-style-type: none"> <li>• <math>50 &lt; HU \leq 80</math>: Yellow</li> <li>• <math>80 &lt; HU</math>: Red</li> </ul>
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• <b>Ready</b> (White) - Standby</li> <li>• <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li> <li>• <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>
	<b>Exposure Enable</b>	<p>Depending on the generator, detector, and viewer status, the status of shooting and image acquisition is displayed at the bottom of the screen.</p> <ul style="list-style-type: none"> <li>• Green – Recording is possible (Ex. Ready, etc.)</li> <li>• Yellow – Shooting is possible (Ex. Image Processing), but other tasks are in progress.</li> <li>• Red – Recording is not possible, and images cannot be obtained. (Ex. Not ready, Abnormal generator, etc.)</li> </ul>
		<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.20.6 Error and Warning Messages of Spellman.ZEUS Generator

When the error condition is resolved, the UI is initialized.

#### Error Message

Code	Error Message
1	Initialization device error
3	Generator CPU EEPROM Data Checksum Error
4	Generator CPU Real Time Clock error
5	Main Contactor Error
6	Rotor Fault
7	Filament Fault
9	Beam Cathode Fault
10	Beam Anode Fault
11	Beam_INVA Fault

12	Beam_INVB Fault
13	Beam_KV Fault
14	Beam_IR Fault
15	Beam_tank NC
16	Beam_KV is not balance
17	Inverter is too hot
18	Prepare Hand Switch Press Timeout
19	X-Ray Hand Switch Release timeout
20	No KV During Exposure
21	mA During Exposure Too High
22	mA During Exposure Too Low
23	Manually Terminated Exposure
24	AEC Back-up Timer Exceeded - Exposure Terminated
25	AEC Back-up MAS Exceeded - Exposure Terminated
26	Exposure Terminated abnormal
27	Anode heat limit
28	Thermal Switch Interlock #1 Error
29	Door Interlock Error
31	Bucky 1 Not Contact Error
33	Bucky 2 Not Contact Error
34	Prep Input Active During Initialization Phase
35	X-ray Input Active During Initialization Phase
36	Console Communication Error
37	+12VDC Error
38	-12VDC Error
43	High Voltage Error - KV Detected in Non X-ray Status
48	Current reception is not enable
49	AEC is not enable for current reception
51	AEC Feedback Error (No Feedback Signal Detected)
52	Small Focus High Filament Current Error in Standby
53	Large Focus High Filament Current Error in Standby
54	AEC Reference out of range
56	No Tube data has been Programmed
57	AEC Stop signal in wrong status
60	High KV Error
61	Low KV Error
70	AEC channel error
71	Boost filament current error
72	Preheat filament current error
73	No or invalid Filmscreen
74	DC BUS voltage is error, voltage too high or too low

75	Tube count data corrupt
77	Peripherals Detector Error
78	Rotor Over Current
79	AEC Ion Chamber Disconnect
80	Inverter Capacitor Failed
81	I2C Write/Read Error
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
104	Calibration Error - No mA
106	Calibration Limit, Selected Parameter Not Calibrated
107	Pre-charge Relay Fault
108	Large filament set parameter is more than max. filament current
109	Small filament set parameter is more than max. Filament current.
110	Prep Parameter kV Error
111	Prep Parameter mA Error
112	Prep Parameter ms Error
113	Prep Parameter Rotor Speed Error
114	Prep Parameter Focus Error

### Warning Message

Code	Warning Message
45	Communication Message Not Supported
46	Communication Message Not Allowed
55	No AEC field is selected
58	Wrong Tube ID
200	Anode HU Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit
212	Generator AEC Density Limit
213	Invalid Communication Parameter
220	Reset receive buffer
230	Stitching parameters exceed limits
231	Stitching Interval over time

233	Stitching Mode Wrong Focus
234	Pulse width limit in TOMO Mode
235	Pulse quantity limit in TOMO Mode
236	Pulse Interval time limit in TOMO Mode
237	Wrong Exposure Tech in TOMO Mode
238	Trigger mode exceed in TOMO mode

### 3.21 SPELLMAN.HFE

This section explains about the integration process between **VXvue** and the **SPELLMAN.HFE** generator models.

#### Integration Condition

Complies with the communication standard of RS-232.

#### Integration Model

HFe 501, HFe 601

Mapped VXvue ver.	SPELLMAN.HFE Generator Firmware ver.
V1.0.4	V3.11 (r25)



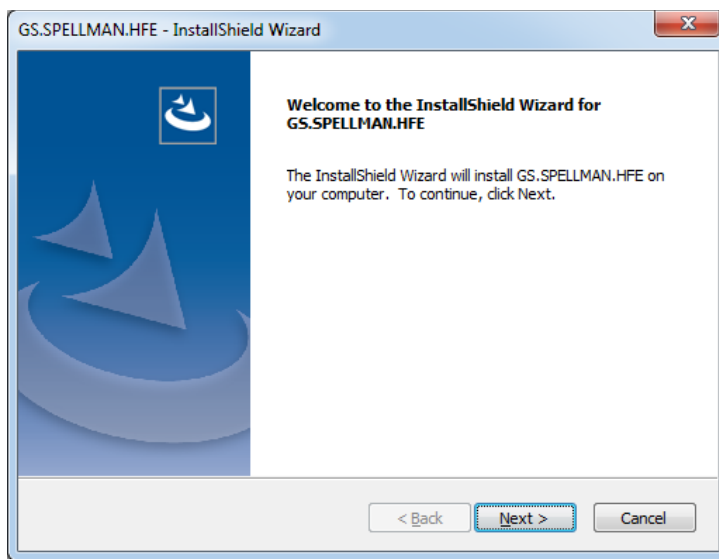
- Please contact Spellman for the box of Generator Interface module in the form of mini console.

#### 3.21.1 Installing GS

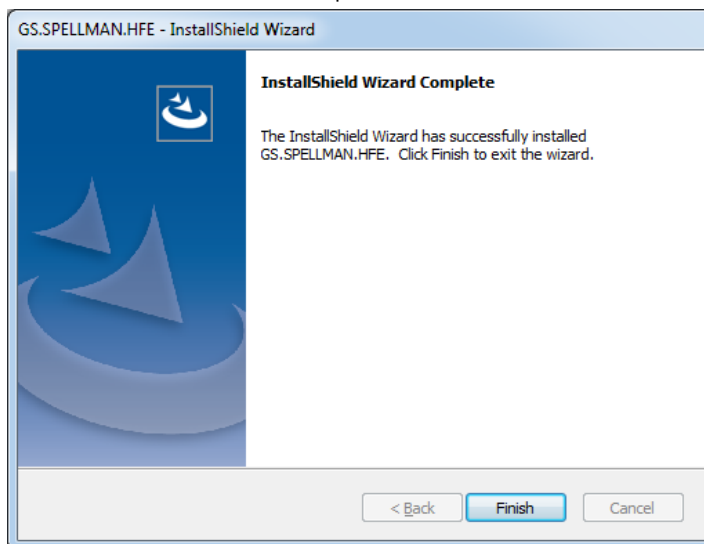


- You should install **GS.SPELLMAN.HFE.Setup.exe** separately to use the SPELLMAN.HFE generator. Contact the person in charge of Vieworks if it is needed to install the file.

- 1 Install **VXvue**.
- 2 Execute **GS.SPELLMAN.HFE.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing **GS.SPELLMAN.HFE**.



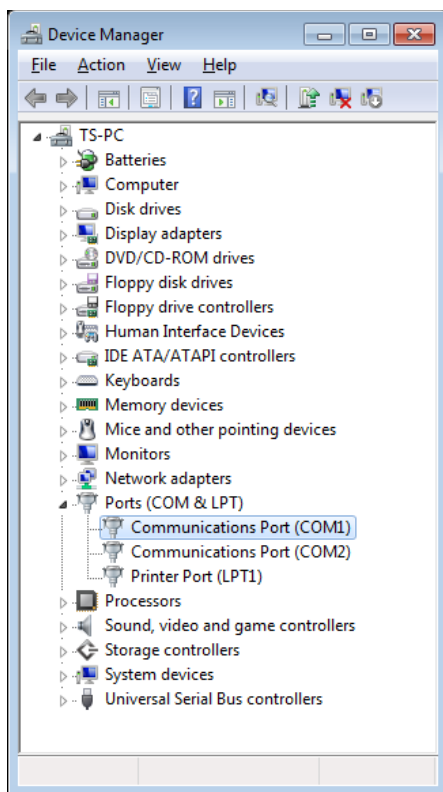
- 4 Click the **Finish** button to complete the installation.



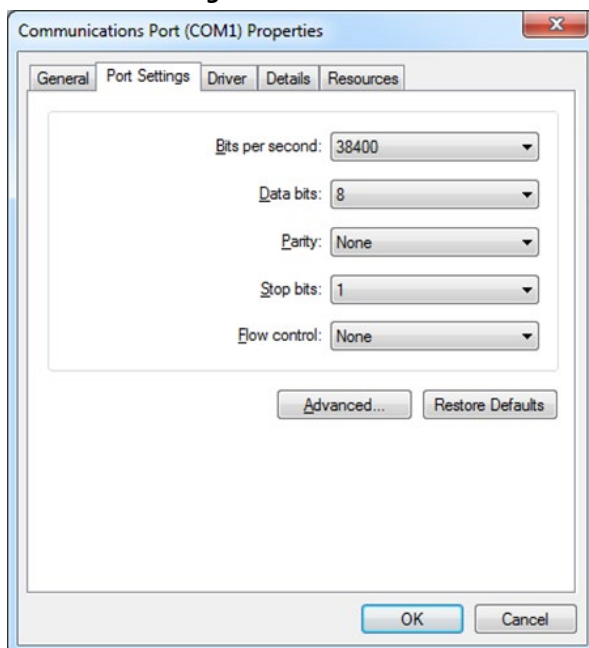
- 5 Check if the **GS.SPELLMAN.HFE** folder and the required files are installed in the following path.  
C:\Program files\WVXvue\GENERATOR\Protocol\GS.SPELLMAN.HFE\

### 3.21.2 How to Set Port from PC

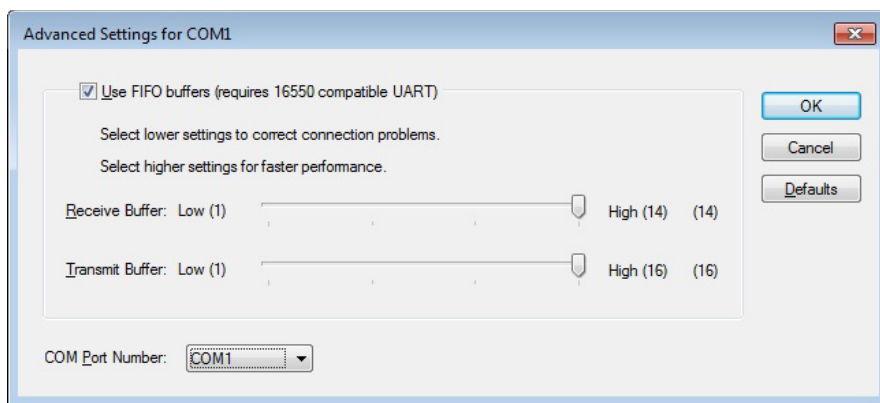
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click the **OK** button after appointing **COM Port Number** to be used.




- Input or choose the configured COM port number when setting generator in VXSetup.

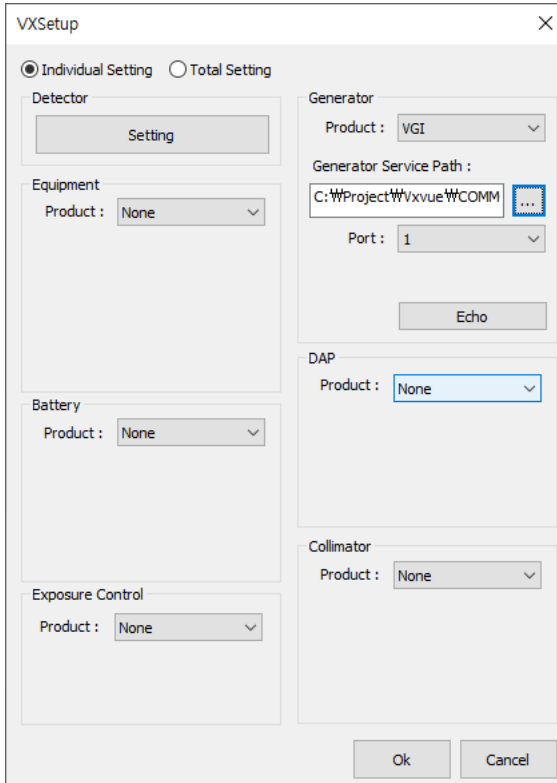
### 3.21.3 How to Set SPELLMAN.HFE Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: VGI
  - Port: COM port number set on the PC. (Refer to <3.21.2 How to Set Port from PC>.)

- 3 Click  button to input the path of GS.SPELLMAN.HFE.exe (Generator Service) prepared in <3.21.1 Installing GS>.
- Ex.) C:\Program files\WVXvue\WGENERATOR\WProtocol\WGS.SPELLMAN.HFE\WGS.SPELLMAN.HFE.exe

- 4 Click the **Echo** button to check the connecting status.



- 5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a cable (RS-232c) before setting items of generator in VXSetup.

## VXvue



- The SPELLMAN.HFE generator is integrated directly with VXvue and VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.21.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
 ▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Density / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Center	AEC Right	AEC De...
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.21.5 How to Use SPELLMAN.HFE Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port setting, etc.)





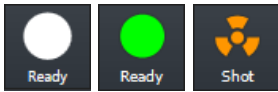
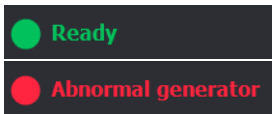


- You can perform the following functions.
  - Using AEC function
  - Adjusting kVp and mAs
  - Adjusting mA and ms instead of mAs

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
AEC	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

#### Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with the SPELLMAN.HFE generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	AEC	Enable to apply AEC functions.
	AEC Field (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>Default setting: <b>Center</b></li> <li>Enable to select multiple AEC fields.</li> </ul>
	Density	Enable to adjust the density of AEC.

	<b>Film / Screen</b>	<p>Enable to set film and screen (Sensitivity) of AEC</p> <ul style="list-style-type: none"> <li>▪ ZOOM-0, ZOOM-1, ZOOM-2, FFS400, FFS800</li> </ul>
	<b>Focal Spot Size (Small / Large)</b>	<p>Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.</p> <ul style="list-style-type: none"> <li>• Automatic setting option when APR is selected: Large</li> </ul>
	<b>Reset</b>	<p>When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message.</p> <ul style="list-style-type: none"> <li>• Click this icon at this time to start reset.</li> </ul>
	<b>Heat Units (Anode)</b>	<p>The color of icon changes according to the heat units.</p> <ul style="list-style-type: none"> <li>• <math>0 &lt; HU \leq 50</math>: Green</li> <li>• <math>50 &lt; HU \leq 80</math>: Yellow</li> <li>• <math>80 &lt; HU</math>: Red</li> </ul>
	<b>X-ray Status</b>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• <b>Ready</b> (White) - Standby</li> <li>• <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li> <li>• <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>
	<b>Exposure Enable</b>	<p>Depending on the generator, detector, and viewer status, the status of shooting and image acquisition is displayed at the bottom of the screen.</p> <ul style="list-style-type: none"> <li>• <b>Green</b> – Recording is possible (Ex. Ready, etc.)</li> <li>• <b>Yellow</b> – Shooting is possible (Ex. Image Processing), but other tasks are in progress.</li> <li>• <b>Red</b> – Recording is not possible, and images cannot be obtained. (Ex. Not ready, Abnormal generator, etc.)</li> </ul>
	<ul style="list-style-type: none"> <li>• <b>GS.SPELLMAN.HFE</b> defaults to using AEC. If AEC is not configured in use environment, modify the value of &lt;SupportAEC&gt; in the &lt;QueryFunction&gt; item of the Integration setup file (GS.SPELLMAN.HFE.xml) located in the GS.SPEELMAN.HFE installation folder to 0.</li> </ul>	
	<ul style="list-style-type: none"> <li>• <b>GS.SPELLMAN.HFE</b> defaults to using DAP. If DAP is not configured in use environment, modify the value of &lt;SupportDAP&gt; in the &lt;QueryFunction&gt; item of the Integration setup file (GS.SPELLMAN.HFE.xml) located in the GS.SPEELMAN.HFE installation folder to 0.</li> </ul>	



- SPELLMAN.HFE generators offer up to five types of AEC film speed.
- The default film speed of GS.SPELLMAN.HFE is set to ZOOM-0, ZOOM-1, ZOOM-2, FFS400, FFS800.
- If the setting value of AEC film speed of generator is different from the default value, modify the value of the <FilmSpeed> item in the Configuration file (GS.SPELLMAN.HFE.xml) located in the GS.SPEELMAN.HFE installation folder to be the same as the generator setting value.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about the **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.21.6 Error and Warning Messages of SPELLMAN.HFE Generator

- Recoverable Error: The **Reset** button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

#### Error Messages

Code	Error Message
1	Error tube kV max
2	error control A max
3	error tube mA max
4	Error tube +-kV diff
5	Error tube +-mA diff
6	Error ROM test
7	Error RAM test
8	Error unknown
9	Error no Tube kV
10	Error tube kV too high
11	Error inverter overload ( > 150000WS)
12	Error comm. send timeout
13	Error checksum E <sup>2</sup> Prom
14	Error watchdog
15	Error comm. receive timeout
16	Error E <sup>2</sup> Prom wait timeout
17	Error filament system
18	Error DAP system
19	Filament parameter anomaly in the E <sup>2</sup> Prom
20	Error +-15V low

21	Error +5V low (+ -5%)
22	Error key is on (during start of the generator)
23	Error XRAY key is on (during start of the generator)
24	mAs max
25	Error exposure too short
26	Error generator not ready
27	Warning service (Service-Interval)
28	Error no Tube mA (< 50% after 30ms)
29	Error tube > 70°C
30	Info To save data push 'M'
31	Error 'NOT' signal
32	Error door open
33	Error exp. time > 6.3s
34	Error exp. time > 3.2s (with AEC)
35	Error exp. time < 2ms (with AEC)
36	Error AEC exposure break (with AEC)
37	Error dose too low after 50ms (with AEC)
38	Error pulse delay too long (with AEC, > 2sec)
39	Error exp. prepare timeout
40	Error device ready timeout
41	Error starter timeout
42	Error grid is on
43	Error RTC checksum, Batt. low
44	Error HSS system
45	Error no main current
46	Error exp. stopped by user
47	controller - E <sup>2</sup> prom verify
48	Wrong tube position
49	Tube mA too high
50	Device not ready (CAN)
51	No BUS-Signal from AEC
52	FLXIS not ready
53	! Anode heat content >100% !
55	Temperature Error
56	Dose rate too high
61	Error Comm. receiver overrun
62	Error Comm. transmit. overrun
63	Error Comm. controller
64	CAN system
65	bus system
67	SCB Communication timeout

68	SCB wrong version
90	HSS2 fault
91	HSS2 Low Voltage Power Supply
92	HSS2 output short or heavy load
93	HSS2 phase over current
94	HSS2 phase under current
95	HSS2 DC bus under voltage
96	HSS2 excessive run timeout
97	HSS2 configuration error
9999	Generator Disconnected

### Warning Messages

Code	Warning Message
1000	Not supported AEC Film Speed
1001	Not supported Exposure Mode

## 3.22 CPI.INDICO.IQ

This section explains about the integration process between **VXvue** and the **CPI.INDICO.IQ** generator models.

### Integration Condition

Complies with the communication standard of RS-232.

### Integration Model

- Indico IQ

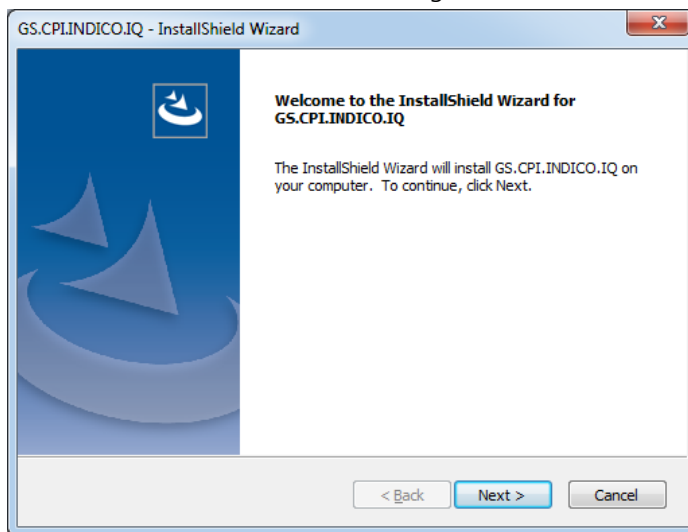
Mapped VXvue ver.	CPI.INDICO.IQ Generator Firmware ver.
V1.0.1.3	3.00.34

### 3.22.1 Installing GS

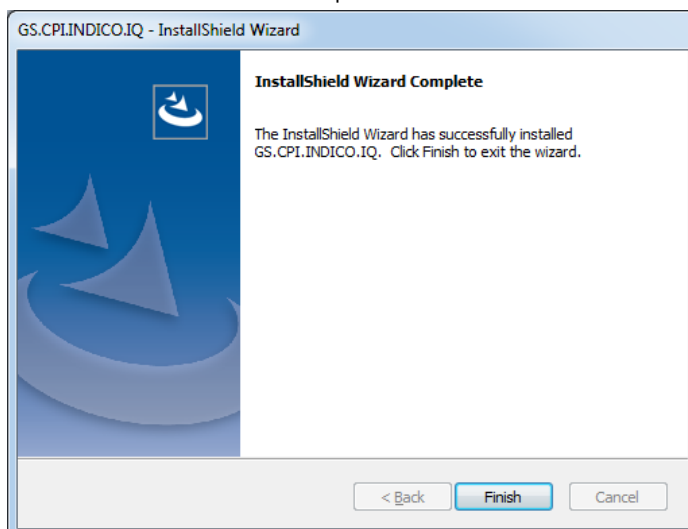


- You should install **GS.CPI.INDICO.IQ.Setup.exe** separately to use the CPI.INDICO.IQ generator. Contact the person in charge of Vieworks if it is needed to install the file.

- 1 Install **VXvue**.
- 2 Execute **GS.CPI.INDICO.IQ.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing **GS.CPI.INDICO.IQ**.



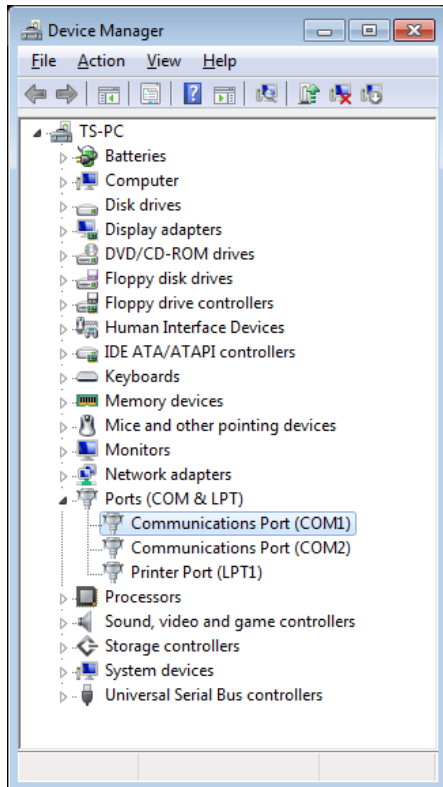
- 4 Click the **Finish** button to complete the installation.



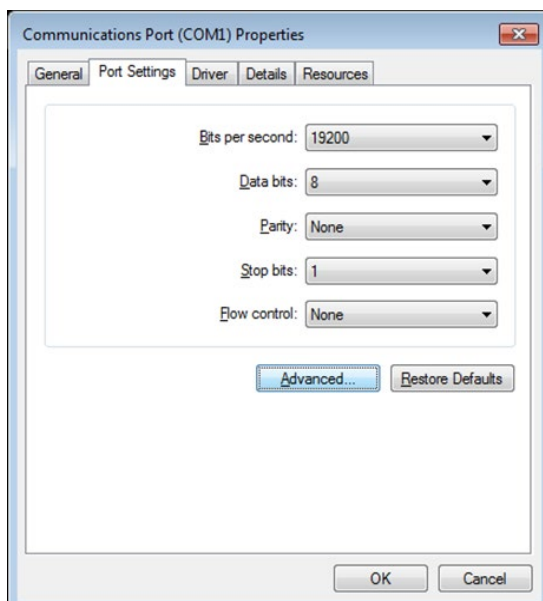
- 5 Check if the **GS.CPI.INDICO.IQ** folder and the required files are installed in the following path.  
C:\Program files\VXvue\GENERATOR\Protocol\GS.CPI.INDICO.IQ\

### 3.22.2 How to Set Port from PC

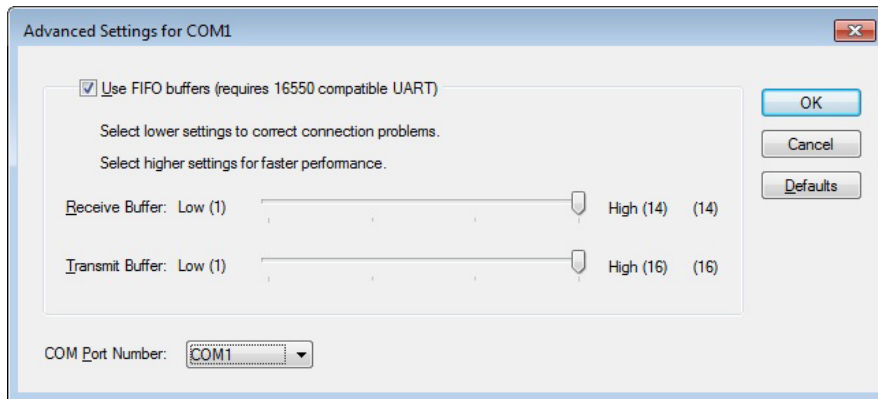
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.

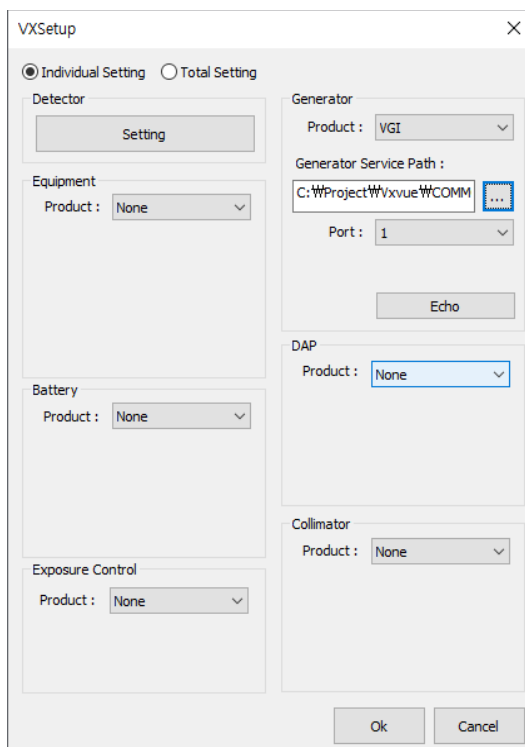


- Input or choose the configured COM port number when setting generator in VXSetup.

### 3.22.3 How to Set CPI.INDICO.IQ Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows;
  - Product: VGI
  - Port: COM port number set on the PC. (Refer to <3.22.2 How to Set Port from PC>.)
- 3 Click  button to input the path of GS. CPI.INDICO.IQ.exe (Generator Service) prepared in <3.22.1 Installing GS>.
  - Ex.) C:\Program files\VXvue\GENERATOR\Protocol\GS.CPI.INDICO.IQ\GS.CPI.INDICO.IQ.exe
- 4 Click the **Echo** button to check the connecting status.



5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a cable (RS-232c) before setting items of generator in VXSetup.

## VXvue



- The CPI.INDICO.IQ generator is integrated directly with VXvue and VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You
- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.22.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Density / Focal Spot / AEC\_L, AEC\_R, AEC\_C** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Cen...	AEC Right	AEC De...	Focal Spot
Abdomen Erect	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen Erect	Pediatric	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen KUB	Pediatric	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Large	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Medium	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Small	Current	50	1	100	10	N	N	N	0	Current
Abdomen Supine	Pediatric	Current	50	1	100	10	N	N	N	0	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select Current in the **Focal Spot** column, the focal spot automatically adjusts based on the mA range set in the generator. If you select Small or Large, the Focal Spot is forcibly selected when you select Step regardless of the mA value you set.
- In **GS.CPI.INDICO.IQ**, the default value of maximum mA for Small Focus is 160mA. If this value is different from the generator setting, modify the value of the <SmallFocusMaxMA> item in the Configuration file (GS.CPI.INDICO.IQ.xml) located in the GS.CPI.INDICO.IQ installation folder to be the same as the generator setting.
- If you select a value other than Current in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.22.5 How to Use CPI.INDICO.IQ Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

You can perform the following functions.

- Using AEC function
- Adjusting kVp and mAs
- Adjusting mA and ms instead of mAs

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
AEC (Backup mode: mAs, mA/ms)	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100







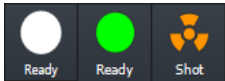



- The **CPI** generator supports **AEC Backup** mode which sets the maximum limitation of **ms** and **mAs** while taking X-rays under the **AEC** mode.
  - Auto - The maximum limitation of ms and mAs is set automatically under the AEC mode automatically (Unable to set by a user.)
  - mAs - The maximum limitation of mAs for shooting X-ray under the AEC mode is set.
  - ms - The maximum limitation of ms for shooting X-ray under the AEC mode is set.
- Contact the manufacturer of CPI generator for the information of setting the AEC Backup mode.

#### Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with the CPI.INDICO.IQ generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.


	<b>AEC</b>	Enable to apply AEC functions.
	<b>AEC Field</b> (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>• Default setting: <b>Center</b></li> <li>• Enable to select multiple AEC fields.</li> </ul>
	<b>Density</b>	Enable to adjust the density of AEC.
	<b>Focal Spot Size</b> (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	<b>Reset</b>	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>• Click this icon at this time to start reset.</li> </ul>
	<b>Heat Units (Anode)</b>	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• <math>0 &lt; HU \leq 50</math>: Green</li> <li>• <math>50 &lt; HU \leq 80</math>: Yellow</li> <li>• <math>80 &lt; HU</math>: Red</li> </ul>
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>• <b>Ready</b> (White) - Standby</li> <li>• <b>Ready</b> (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.</li> <li>• <b>Shot</b> (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>• Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about the <b>VXvue</b>.</li> </ul>	

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.22.6 Error and Warning Messages of CPI.INDICO.IQ Generator

	<ul style="list-style-type: none"> <li>• Contact the manufacturer of generator if error or warning messages keep displaying even though you click the <b>Reset</b> button or reboot the generator.</li> </ul>
---	---

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

**Error Messages**

<b>Code</b>	<b>Error Message</b>
1	Unknown Hardware Revision
2	Work State Mismatch
3	Exposure Signal Error
4	Exposure Trigger Error
5	+35 VDC Error
6	-35 VDC Error
7	Rectifier Interlock Error
8	Aux Interlock Error
9	Fan 1 Speed Error
10	Fan 2 Speed Error
11	Fan 3 Speed Error
12	Fan 4 Speed Error
13	Fan 5 Speed Error
14	Fan 6 Speed Error
15	Generator Clock Error
16	Battery Low Error
17	+12VDC Error
18	-12VDC Error
19	+15VDC Error
20	-15VDC Error
21	DAP Power Supply Error
22	+24VDC Error
23	-24VDC Error
24	220VAC Failure
25	110VAC Failure
26	26VAC Failure
27	18VAC Phase 1 Failure
28	18VAC Phase 2 Failure
91	ACB Firmware Update
92	RIO Firmware Update
93	DSS Firmware Update
101	DC Bus Charge Timeout
102	DC Bus Not Charging
103	DC Bus Discharge Active
104	DC Bus Fault
105	Phase A Voltage Error
106	Phase B Voltage Error
107	Phase C Voltage Error
108	Tube / High Voltage Arc

109	Tube / High Voltage Arc 1
110	Tube / High Voltage Arc 2
111	Tube / High Voltage Arc 3
112	Tube Arc Anode
113	Tube Arc Cathode
114	Over-Voltage
115	Tank Cable Interlock Error
116	Can Cable Interlock Error
117	Exposure Over Time Error
118	kV High During Exposure
119	kV Low During Exposure
120	High kV During Standby
121	mA High During Exposure
122	mA Low During Exposure
123	ADR Interlock Error
124	ADR Open Circuit Error
125	ADR Short Circuit Error
126	Tube Pump / Thermal Error
128	Heat Exchanger Flow Error
129	ADR 2 Not Ready
130	Heat Exchanger Cable Error
131	Heat Exchanger Over Current Error
201	Rotor Active In Standby
202	Rotor Boost Error
203	Rotor Run Error
204	LF Feedback Too Low
205	SF Feedback Too Low
206	LF Feedback High In Standby
208	SF Feedback High In Standby
210	Filament Mismatch
212	DAP Not Ready
213	DAP Device Error
214	AEC Stop Signal Error
215	AEC Reference Error
216	AEC Device Error
217	AEC Backup Time
218	AEC Backup mAs
219	Tomo Device Error
220	Tomo Backup Time
221	No Sync Pulse
222	Inverter Temperature High

223	Resonant Temperature High
224	Ambient Temperature High
225	Generator Duty Cycle Limit
226	Tube Thermal Switch 1 Open
227	Tube Thermal Switch 2 Open
228	Oil Switch Open
229	DSS Not Configured
230	DSS Failed To Config
231	DSS Dip Switch Wrong
232	DSS Data Corrupted
233	DSS Busy
234	DSS Low Speed Not Supported
235	DSS High Speed Not Supported
236	DSS Rotor Inverter Wrong
237	DSS mAin Current Low
238	DSS mAin Current High
239	DSS Shift Current Low
240	DSS Shift Current High
241	DSS Inverter Trip
242	DSS Phase Wrong
242	DSS Phase Wrong
243	DSS VBUS Low
244	DSS VBUS Mismatch
245	DSS Cap Not Found
246	DSS In Thawing
247	DSS Phase Current Low
248	DSS Phase Current High
249	DSS Fan Speed Low
250	DSS Fan Speed High
251	DSS Cpu Temperature High
252	DSS Thawing Failure
253	Inverter Temperature Low
254	Resonant Temperature Low
255	Ambient Temperature Low
256	DSS Inverter Temperature High
301	Invalid Core Data
302	Invalid Tube Data
303	Invalid Starter Data
304	Invalid Gen Limits
305	Invalid Rec Data
306	Invalid Room I/O Data

307	Invalid AEC Data
308	Invalid AEC Cal Data
309	Invalid AEC Density Data
310	Invalid Fluoro Data
311	Invalid CF Data
312	Invalid PF Data
313	Invalid HLCF Data
314	Invalid HLPF Data
315	Invalid DAP Data
316	Invalid AK Data
317	Invalid SID Data
318	Invalid FRTC Data
319	Invalid Cal Data
320	Invalid Statistics
321	Invalid Error Log
322	Invalid Data Backup File
323	Invalid Power Supply Data
324	Invalid Cine Data
325	Invalid LLCF Data
326	Invalid LLPF Data
327	Invalid EPF Data
401	Auto-Cal Minimum mA Error
403	Auto-Cal No mA Error
404	Auto-Cal Table Exceeded
405	Auto-Cal Maximum Filament Current
501	Room Input1 Error
502	Room Input2 Error
503	Room Input3 Error
504	Room Input4 Error
505	Room Input5 Error
506	Room Input6 Error
507	Room Input7 Error
508	Room Input8 Error
509	Room Input9 Error
510	Room Input10 Error
511	Room Inpu11 Error
512	Room Input12 Error
513	Room Input13 Error
514	Room Input14 Error
515	Room Input15 Error
516	Room Input16 Error

517	Room Xray Disable
518	Room Fluoro Reset
590	Room High Speed Input1 Error
591	Room High Speed Input2 Error
592	Room High Speed Input3 Error
593	Room High Speed Input4 Error
594	Room High Speed Input5 Error
595	Room High Speed Input6 Error
596	Room High Speed Input7 Error
597	Room High Speed Input8 Error
601	Comm Error
602	Invalid Communication Message
603	Message Not Supported
604	Message Not Allowed
605	Digital Comm Error
606	ACB Canbus Comm Error
607	RIOB Canbus Comm Error
608	DSS Canbus Comm Error
609	AEC Canbus Comm Error
610	Communication Response Time Out
701	No Valid License
702	Feature Locked
703	Invalid License
901	Manually Terminated Exposure
902	Factory Default Switch Closed
903	Prep Switch Closed
904	X-Ray Switch Closed
905	Fluoro Switch Closed
906	Prep Timeout
952	Anode Over Heat
962	Exposure Not Allowed
963	mAs Timeout
971	Cine Run Time Limit
972	RAD Run Time Limit
990	Remote Prep Switch Closed
991	Remote X-Ray Switch Closed
992	Remote Fluoro Switch Closed

### Warning Messages

Code	Warning Message
90	Fluoro Focus Warning

127	Heat Exchanger Water Warning
257	Inverter Temperature Warning
258	Ambient Temperature Warning
908	Generator kW Limit
909	Generator kV Limit
910	Generator mA Limit
911	Generator ms Limit
912	Generator mAs Limit
913	Tube kW Limit
914	Tube kV Limit
915	Tube mA Limit
916	AEC Density Limit
917	Fluoro PPS Limit
918	Tube Calibration Limit
920	kV Change Not Allowed
921	mA Change Not Allowed
922	ms Change Not Allowed
923	mAs Change Not Allowed
924	Receptor Change Not Allowed
925	Mode Change Not Allowed
926	Focus Change Not Allowed
927	Tube Change Not Allowed
928	AEC Channel Change Not Allowed
929	AEC Density Change Not Allowed
930	AEC Film Screen Change Not Allowed
931	AEC Fields Change Not Allowed
932	MAG Change Not Allowed
933	PPS Change Not Allowed
934	APR Command Not Allowed
935	Receptor Not Enabled
936	Fluoro Not Enabled
937	ABS Not Enabled
938	PPS Not Enabled
939	DAP Not Enabled
940	AK Not Enabled
941	AEC Not Enabled
942	AEC Film Screen Not Enabled
943	AEC Field Not Enabled
944	No Tube Selected
945	No Focus Selected
946	No Receptor Selected

947	No AEC Channel Selected
948	No AEC Film Screen Selected
949	No AEC Density Selected
950	No AEC Fields Selected
951	Anode Heat Warning
955	DAP Accum Warning
956	DAP Rate Warning
957	AK Accum Warning
958	AK Rate Warning
959	Fluoro Timer Warning
960	Fluoro Timer Limit
961	Fluoro ABS Change Not Allowed
964	AEC Dose Limit
965	DAP Value Overflow
966	Fluoro MAG Not Enabled
967	Fluoro ABS Cruve Not Enabled
968	Cine MAG Change Not Allowed
969	Cine Framerate Change Not Allowed
970	Cine ABS Curve Not Enabled

### 3.23 BMI

This section explains about the integration process between **VXvue** and the **BMI** generator model.

#### Integration Condition

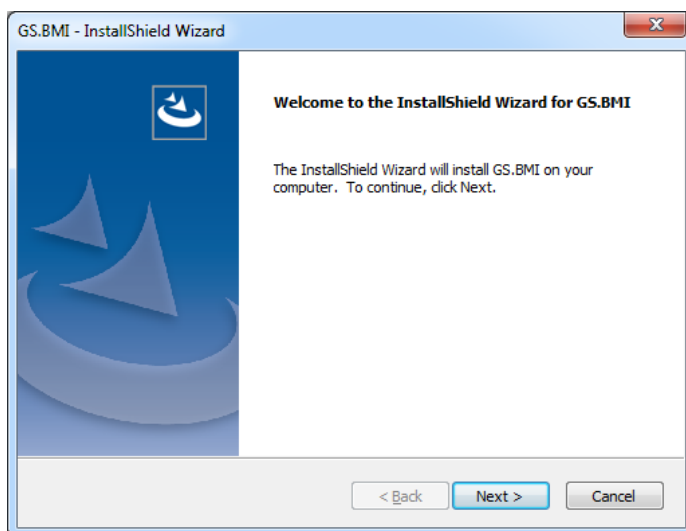
Complies with the communication standard of RS-232.

#### 3.23.1 Installing GS

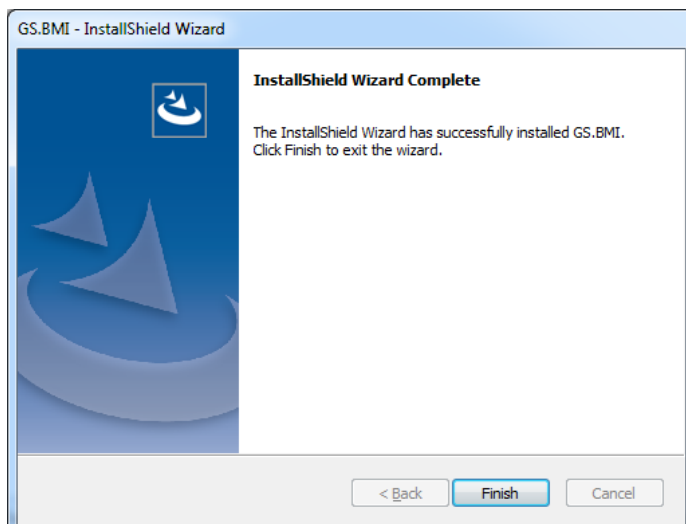


- You should install **GS.BMI.Setup.exe** separately to use the BMI generator. Contact the person in charge of Vieworks if it is needed to install the file.

- 1 Install **VXvue**.
- 2 Execute GS.BMI.Setup.exe file as an administrator mode.
- 3 Click the **Install** button to start installing **GS.BMI**.



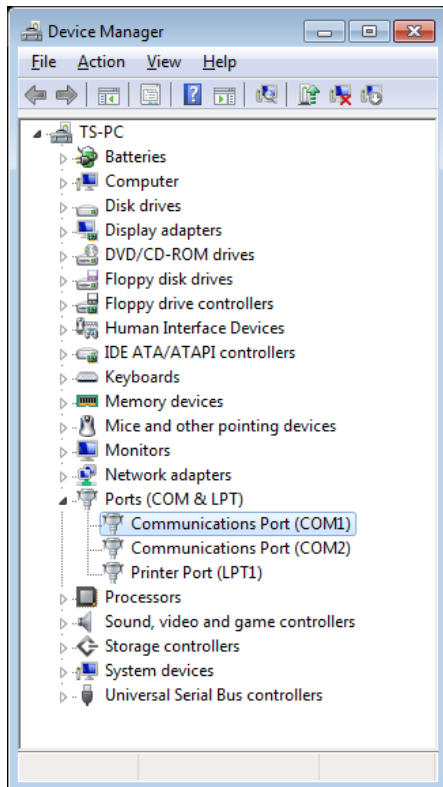
- 4 Click the **Finish** button to complete the installation.



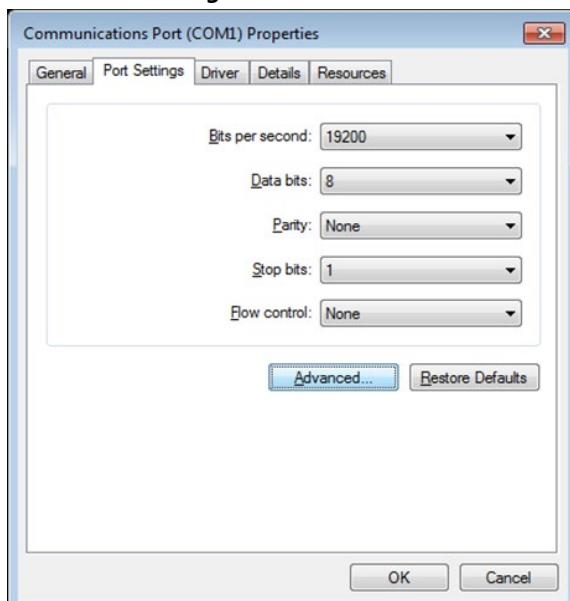
- 5 Check if the **GS.BMI** folder and sub files are properly installed in the following path.  
C:\Program files\WVXvue\GENERATOR\Protocol\GS.BMI\

### 3.23.2 How to Set Port from PC

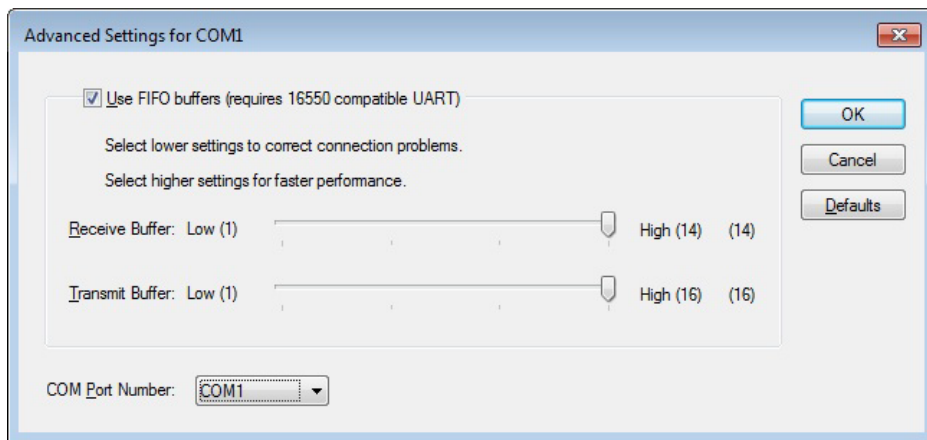
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- Click the **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when setting generator in VXSetup.

### 3.23.3 How to Set BMI Generator in VXSetup and VXvue

#### VXSetup

- Run **VXSetup** and click the **Individual Setting** button.
- Set each item of the **Generator** menu as follows:
  - Product: VGI
  - Port: COM port number set on the PC. (Refer to <3.23.2 How to Set Port from PC>.)
- Click  button to input the path of GS.BMI.exe (Generator Service) prepared in <3.23.1 Installing GS>.
  - Ex.) C:\Program files\WVXvue\GENERATOR\Protocol\GS.BMI\GS.BMI.exe
- Click the **Echo** button to check the connecting status.

VXSetup

☒ Individual Setting ☐ Total Setting

Detector

Setting

Equipment

Product : None

Battery

Product : None

Exposure Control

Product : None

Generator

Product : VGI

Generator Service Path : C:\\Project\\Vxvue\\COMM

Port : 1

Echo

DAP

Product : None

Collimator

Product : None

Ok Cancel

5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a cable (RS-232c) before setting items of generator in VXSetup.

## VXvue



- The BMI generator is integrated directly with VXvue and VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <3.1.2 How to Use Generator in VXvue>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <3.1.2 How to Use Generator in VXvue>.

### 3.23.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.  
▫ Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Procedure Manager

Category

Procedure

Stitch Protocol

Step

Bodypart/Projection

Show All

General

Generator

Collimator

Equipment

Search

Setting

Target E.I.

Select All

Copy From

Insert

Edit

Delete

Name	Patient...	Dose Mode	kVp	mAs	mA	ms
Abdomen Erect	Large	Current	50	1	100	10
Abdomen Erect	Medium	Current	50	1	100	10
Abdomen Erect	Small	Current	50	1	100	10
Abdomen Erect	Pediatric	Current	50	1	100	10
Abdomen KUB	Large	Current	50	1	100	10
Abdomen KUB	Medium	Current	50	1	100	10
Abdomen KUB	Small	Current	50	1	100	10
Abdomen KUB	Pediatric	Current	50	1	100	10
Abdomen Supine	Large	Current	50	1	100	10
Abdomen Supine	Medium	Current	50	1	100	10
Abdomen Supine	Small	Current	50	1	100	10
Abdomen Supine	Pediatric	Current	50	1	100	10



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than **Current** in Dose Mode, it automatically switches to the Dose Mode that was set when Step was selected.

### 3.23.5 How to Use BMI Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You can perform the following functions:
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

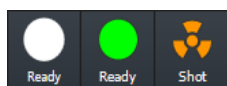
Items	Image					
2 points	70	kVp	▲	▼	20	mAs
	200	mA	▲	▼	100	ms
3 points	70	kVp	▲	▼	20	mAs
	200	mA	▲	▼	100	ms

#### Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with the BMI generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>• Click this icon at this time to start reset.</li> </ul>
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• 0&lt;HU≤50: Green</li> <li>• 50&lt;HU≤80: Yellow</li> </ul>

- 80<HU: Red



#### X-ray Status

The icons and their color are changed depending on the status of generator.

- Ready (White) - Standby
- Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.
- Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about the **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.23.6 Error and Warning Messages of BMI Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Messages

Code	Error Message
18	PR0 Timeout
19	Anode Heat Limit
45	Communication Message Not Supported
46	Communication message Not Allowed
98	Capacitors under charge
99	Tube Head Over Temperature
100	OVL Timeout
101	1st time PB released
102	2nd time PB released
103	Starter contact not available
105	PR1 Timeout

106	PR2 Timeout
107	XR1 Timeout
108	XR0 Timeout
109	OVC Alarm
110	OVL Alarm
112	Invalid focus
113	Min current
114	Max current
115	kV values 85% lower
116	Wrong context
118	Out of range
119	Invalid value
120	Correlation fail
121	Potter contact not available
122	DAP Not Present
123	DAP Disabled
124	DAP Error
126	DR EXP_OK missing
128	XRAY Not Enabled
129	Calibration Not Completed
203	Generator kV Limit
204	Generator mA Limit
205	Generator ms Limit
206	Generator mAs Limit
211	J Limit
212	Tube limit
213	Detector limit
214	Focus Selection
220	Printer timeout
221	Printer Error
222	Printer Disabled
223	Printer Paper Sensor fail
224	Printer No Paper
225	Printer Head Overtemperature
226	Printer Fault

## 3.24 IBIS

This section explains about the integration process between **VXvue** and the **IBIS** generator models.

### Integration Condition

Complies with the communication standard of RS-232.

### Integration Model

Matrix DR / Simply DR / CDR Digital VET



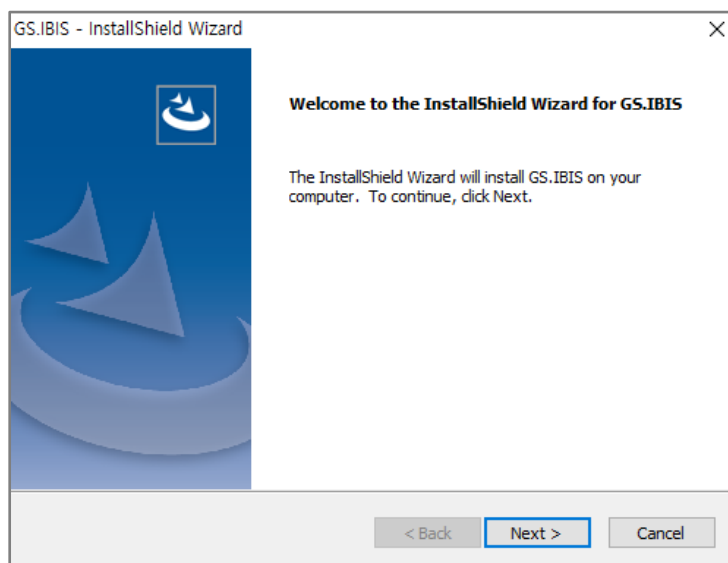
- Some models of the **IBIS** generator cannot be integrated with VXvue depending on their specifications.

### 3.24.1 Installing GS

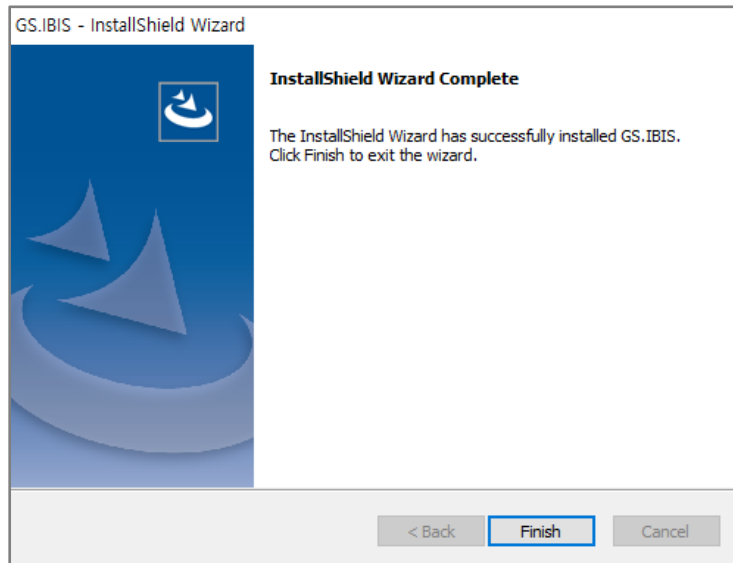


- You should install **GS.IBIS.Setup.exe** separately to use the IBIS generator. Contact the person in charge of Vieworks if it is needed to install the file.

- 1 Install **VXvue**.
- 2 Execute **GS.IBIS.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing the file.



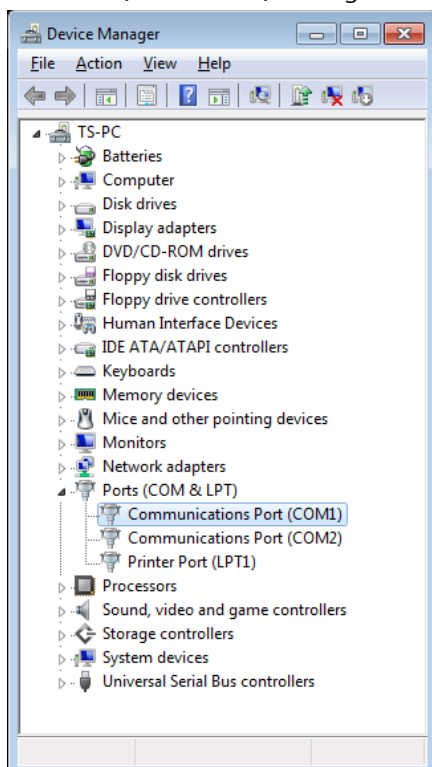
- 4 Click the **Finish** button to complete the installation.



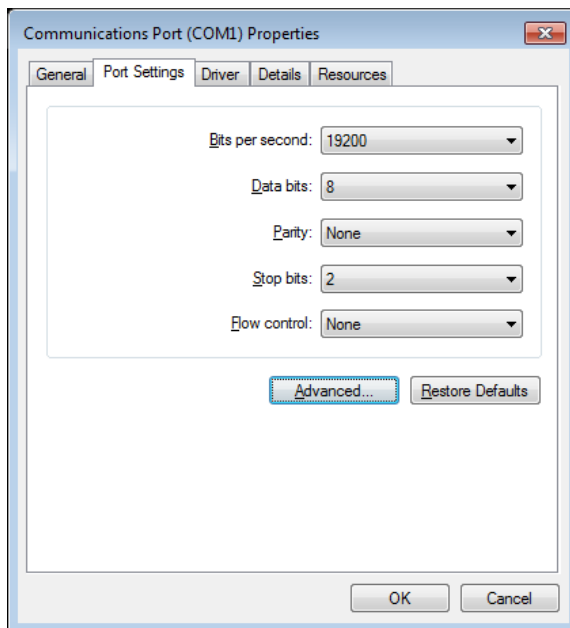
- 5 Check if the **GS.IBIS** folder and the required files are installed in the following path.
  - C:\Program files\WVXvue\GENERATOR\Protocol\GS.IBIS\

### 3.24.2 How to Set Port from PC

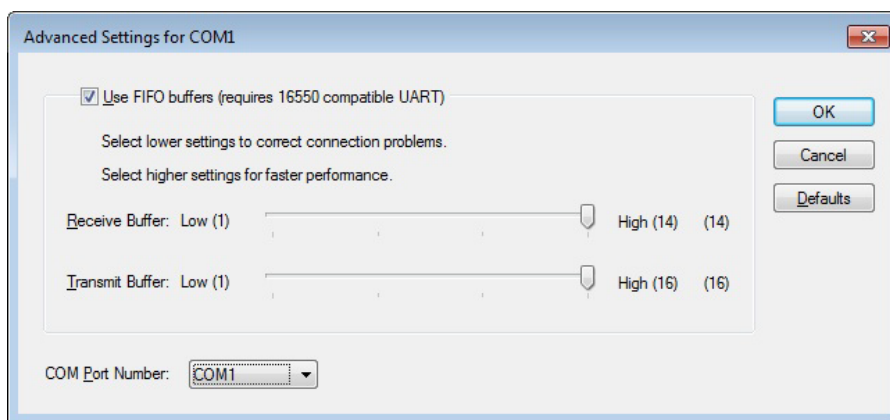
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.

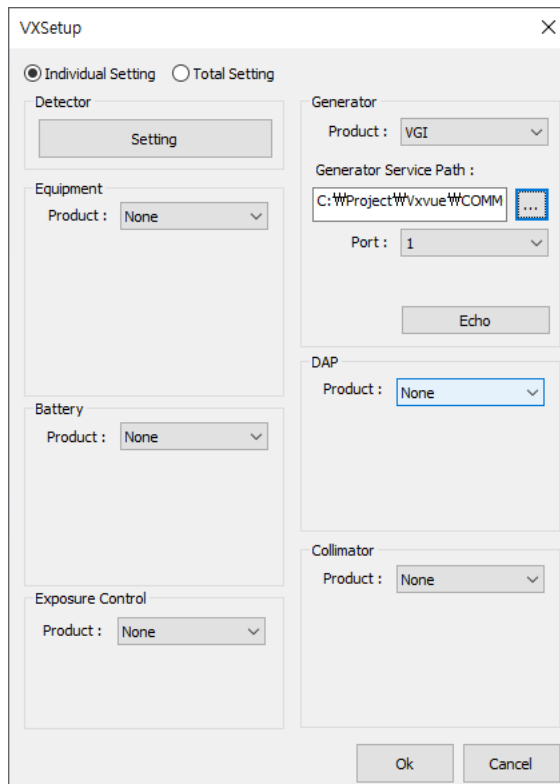


- Input or choose the configured COM port number when setting generator in VXSetup.

### 3.24.3 How to Set IBIS Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: VGI
  - Port: COM port number set on the PC. (Refer to <3.24.2 How to Set Port from PC>.)
- 3 Click  button to input the path of GS.IBIS.exe (Generator Service) prepared in <3.24.1 Installing GS>.
  - Ex.) C:\Program files\WVXvue\GENERATOR\Protocol\WGS.IBIS\WGS.IBIS.exe
- 4 Click the **Echo** button to check the connecting status.



- 5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a cable (RS-232c) before setting items of generator in VXSetup.



- The GS.IBIS generator is integrated directly with VXvue and VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

### 3.24.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Focal Spot** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	Focal Spot
Abdomen Erect	Large	Current	50	1	100	10	Current
Abdomen Erect	Medium	Current	50	1	100	10	Current
Abdomen Erect	Small	Current	50	1	100	10	Current
Abdomen Erect	Pediatric	Current	50	1	100	10	Current
Abdomen KUB	Large	Current	50	1	100	10	Current
Abdomen KUB	Medium	Current	50	1	100	10	Current
Abdomen KUB	Small	Current	50	1	100	10	Current
Abdomen KUB	Pediatric	Current	50	1	100	10	Current
Abdomen Supine	Large	Current	50	1	100	10	Current
Abdomen Supine	Medium	Current	50	1	100	10	Current
Abdomen Supine	Small	Current	50	1	100	10	Current
Abdomen Supine	Pediatric	Current	50	1	100	10	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If **Small** or **Large** is selected in the **Focal Spot** column, the focal spot is automatically adjusted according to the mA range supported by the generator when **Step** is selected. If you select **Change**, the current focal spot is maintained when you select **Step** regardless of the mA value you set.
- If a value other than **Current** is selected in **Dose Mode**, it is automatically converted to the set **Dose Mode** when **Step** is selected.

### 3.24.5 How to Use IBIS Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You can perform the following functions:
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

Items	Image			
2 points	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼
3 points	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼

#### Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with the IBIS generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal spot size is changed automatically depending on the mA setting of generator or change it manually.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>Click this icon at this time to start reset.</li> </ul>
	X-ray Status	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>Ready (White) - Standby</li> <li>Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about the **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.24.6 Error and Warning Messages of IBIS Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Messages

Code	Error Message
1	SUPPLY OF UNIT FAULT
2	TOTAL SAFETY ACTIVE
3	ACTIVATION OF WATCH DOG
4	X-RAY COMMAND ALREADY ACTIVED
5	ALARM FILAMENT FAULT
6	ALARM INVERTER FAULT
7	ALARM SET kV FAULT
8	ALARM THERMIC SAFETY
9	X-RAY COMMAND DISABLED
10	CAPACITOR BANK FAULT
11	CHARGE CAPACITOR FAULT
12	DAP FAULT. Press RESET DAP
128	X_RAY LACKING
129	MAN STOP RX
130	MAX TIME
131	kV FAULT
132	mA FAULT
133	STARTER FAULT
134	X-RAY TUBE HOT
135	POTTER BUCKY FAULT
136	WRONG EXPOSURE

### 3.25 SMAM Revision

This section explains about the integration process between **VXvue** and the **SMAM** generator model.

#### Integration Condition

Complies with the communication standard of RS-232.



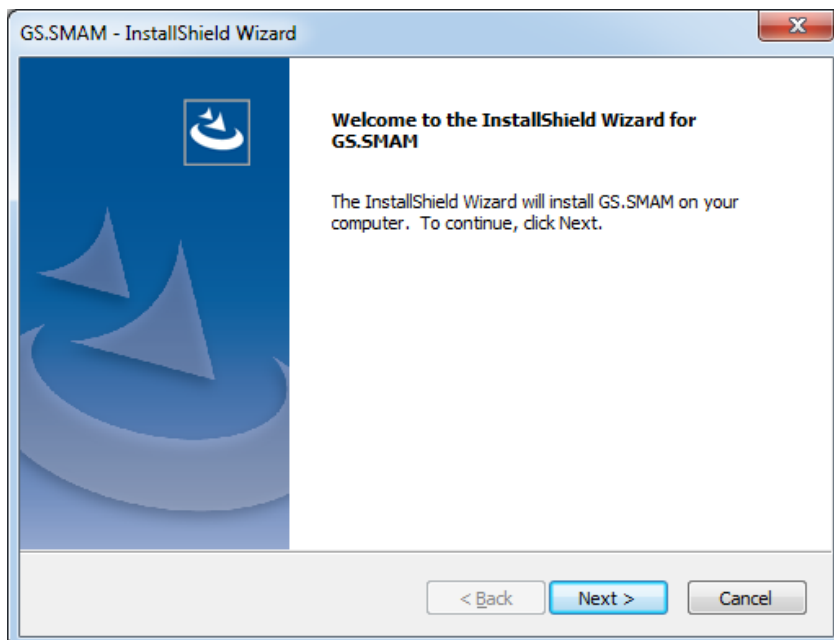
- Some models of the **SMAM** generator cannot be integrated with VXvue depending on their specifications.

#### 3.25.1 Installing GS

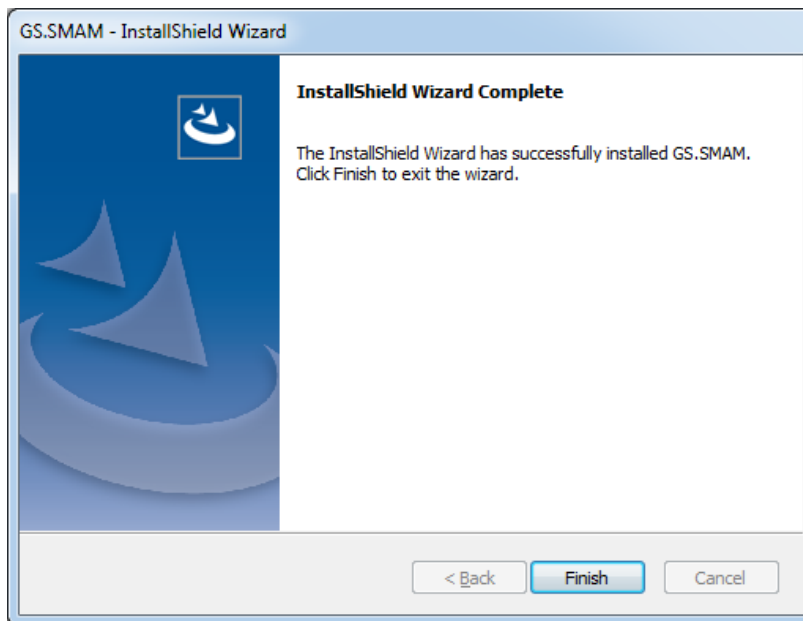


- You should install **GS.SMAM.Setup.exe** separately to use the IBIS generator. Contact the person in charge of Vieworks if you need to install the file.

- 1 Install **VXvue**.
- 2 Execute **GS.SMAM.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing the file.



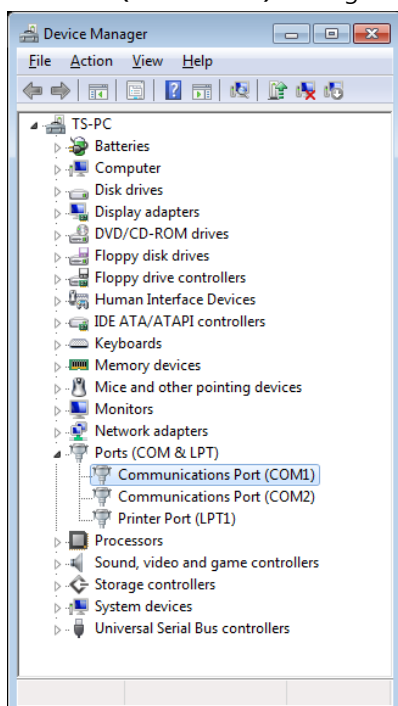
- Click the **Finish** button to complete the installation.



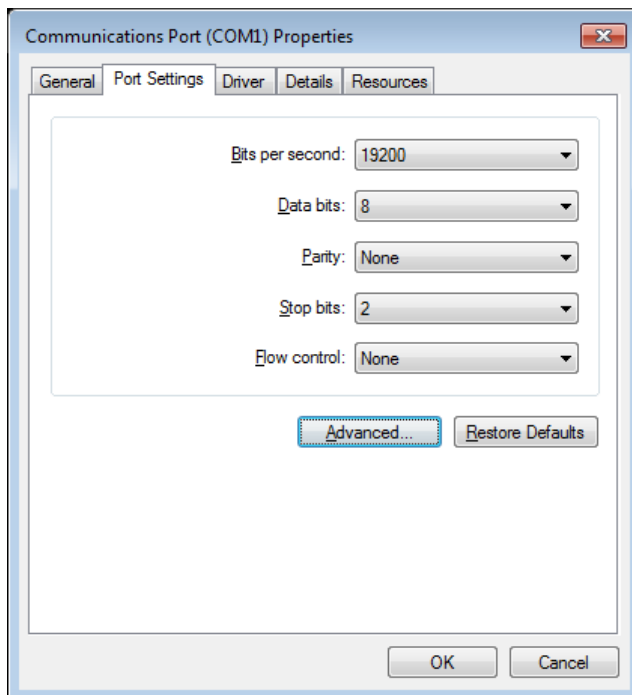
- Check if the **GS.SMAM** folder and the required files are installed in the following path.
  - C:\Program files\WVXvue\GENERATOR\Protocol\GS.SMAM\

### 3.25.2 How to Set Port from PC

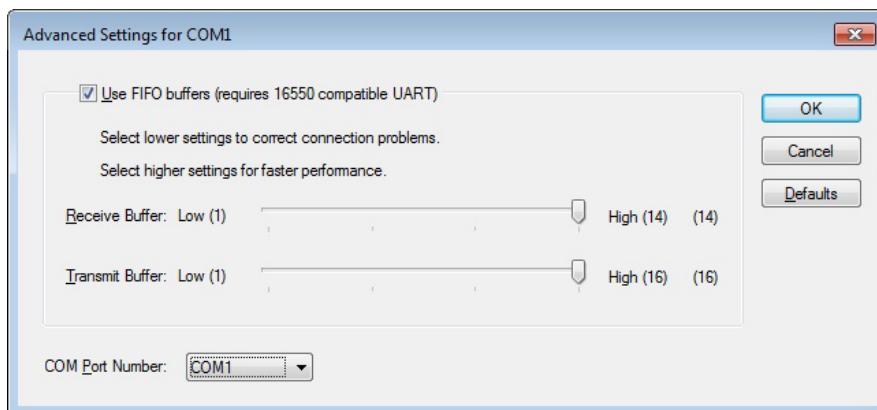
- Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then, choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.

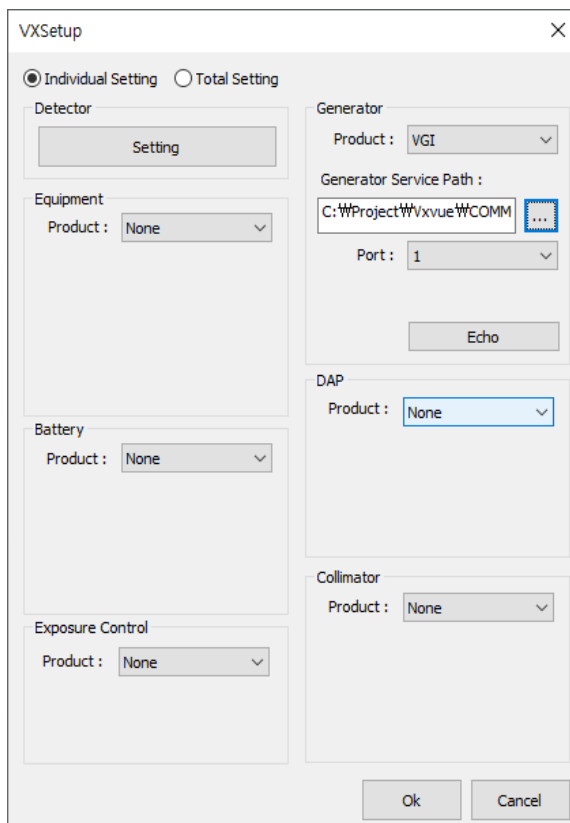


- Input or choose the configured COM port number when setting generator in VXSetup.

### 3.25.3 How to Set SMAM Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of the **Generator** menu as follows:
  - Product: VGI
  - Port: COM port number set on the PC. (Refer to < 3.25.2 How to Set Port from PC>.)
- 3 Click  button to input the path of GS.IBIS.exe (Generator Service) prepared in <3.25.1 Installing GS>.
  - Ex.) C:\Program files\VXvue\GENERATOR\Protocol\GS.SMAM\GS.SMAM.exe
- 4 Click the **Echo** button to check the connecting status.



- 5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a cable (RS-232c) before setting items of generator in VXSetup.

**VXvue**

- The GS.SMAM generator is integrated directly with VXvue and VGI.
- Refer to <3.1.1 Generator Interlock setting> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor (Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.25.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Focal Spot** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	Focal Spot
Abdomen Erect	Large	Current	50	1	100	10	Current
Abdomen Erect	Medium	Current	50	1	100	10	Current
Abdomen Erect	Small	Current	50	1	100	10	Current
Abdomen Erect	Pediatric	Current	50	1	100	10	Current
Abdomen KUB	Large	Current	50	1	100	10	Current
Abdomen KUB	Medium	Current	50	1	100	10	Current
Abdomen KUB	Small	Current	50	1	100	10	Current
Abdomen KUB	Pediatric	Current	50	1	100	10	Current
Abdomen Supine	Large	Current	50	1	100	10	Current
Abdomen Supine	Medium	Current	50	1	100	10	Current
Abdomen Supine	Small	Current	50	1	100	10	Current
Abdomen Supine	Pediatric	Current	50	1	100	10	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If a value other than **Current** is selected in **Dose Mode**, it is automatically converted to the set **Dose Mode** when **Step** is selected.

### 3.25.5 How to Use SMAM Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.





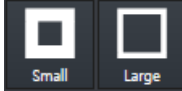




- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)

- You can perform the following functions.
  - Adjusting **kVp** and **mAs**
  - Adjusting **mA** and **ms** instead of **mAs**

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

## Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with the SMAM generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal spot size is changed automatically depending on the mA setting of generator, or change it manually.
	Reset	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>Click this icon at this time to start reset.</li> </ul>
	Heat Units (Anode)	Color changes depending on the heat unit of the generator. <ul style="list-style-type: none"> <li>0&lt;HU≤50: Green</li> <li>50&lt;HU≤80: Yellow</li> <li>80&lt;HU: Red</li> </ul>
	X-ray Status	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>Ready (White) - Standby</li> <li>Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	<ul style="list-style-type: none"> <li>Refer to <b>VXvue Operation Manual</b> and <b>VXvue Service Manual</b> for the detailed information about the <b>VXvue</b>.</li> </ul>	

## Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.25.6 Error and Warning Messages of SMAM Generator



Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

Code	Message
000	No Error
001	Program fault 1
100	PREP released
101	XRAY released
102	CAP charging
200	Ack console timeout
201	Ack Standby timeout
202	Ack Prep timeout
203	Ack Ready timeout
204	Ack XR on timeout
205	Ack XR off timeout
206	Ack Post XR timeout
207	Command unknown
300	Wrong context
301	Out of range
302	Invalid value
303	Correlation fail
400	Starter fail
401	Capacitors low voltage
402	Capacitors critic high V
403	Inverter overheat
404	Inverter ntc open
405	Focus not ready
406	Filament fail
500	Inverter shoot aborted
501	Inverter vin dc high
502	Inverter vin dc low
503	Tube overcurrent
504	Tube undercurrent
505	Tube undervoltage
506	Tube v unbalanced
507	Tube v feedback

508	Inverter monitor
509	Inverter hf overcurrent
600	Potter fail
601	Potter not present
602	Dap not present
603	Dap disabled
604	Dap error
605	Dap timeout
700	Inverter mcu wrong status
701	Inverter mcu coms error
702	Inverter mcu params error
703	Inverter mcu settings error
704	Inverter mcu params mism
705	Inverter mcu settings mism

### 3.26 POWERSITE.PSG.HR

This section explains about the integration process between **VXvue** and **POWERSITE.PSG.HR** Generator.

#### Integration Condition

Complies with the communication standard of RS-232.

#### Integration Model

Powersite PSG HR

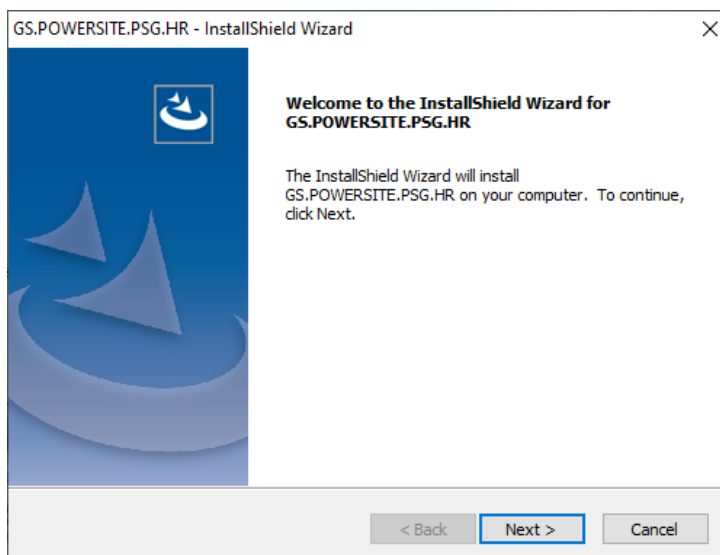
Mapped VXvue ver.	POWERSITE.PSG.HR Generator Firmware ver.
V1.0.5	V1.5

#### 3.26.1 Installing GS

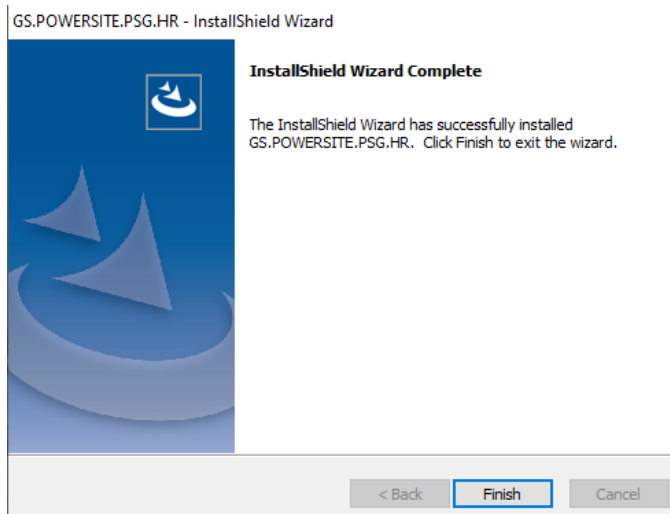


- You should install **GS.POWERSITE.PSG.HR.Setup.exe** separately to use the **POWERSITE.PSG.HR** generator. Contact the person in charge of Vieworks if it is needed to install the file.

- 1 Install **VXvue**.
- 2 Execute GS.POWERSITE.PSG.HR.Setup.exe file as an administrator mode.
- 3 Click the **Install** button for installation.



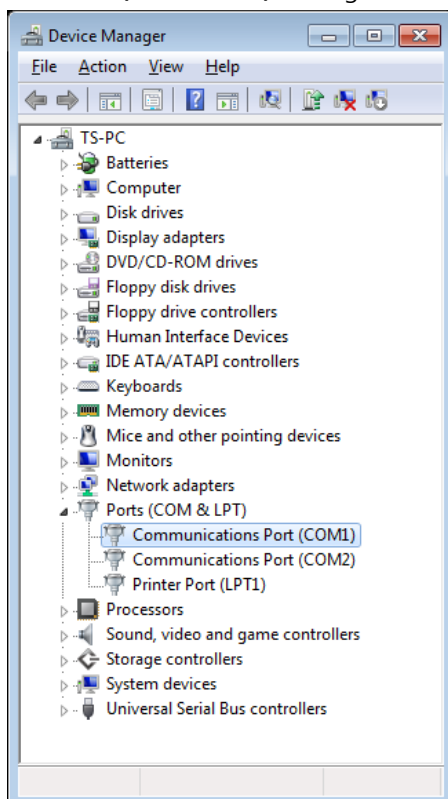
- Click the **Finish** button to complete the installation.



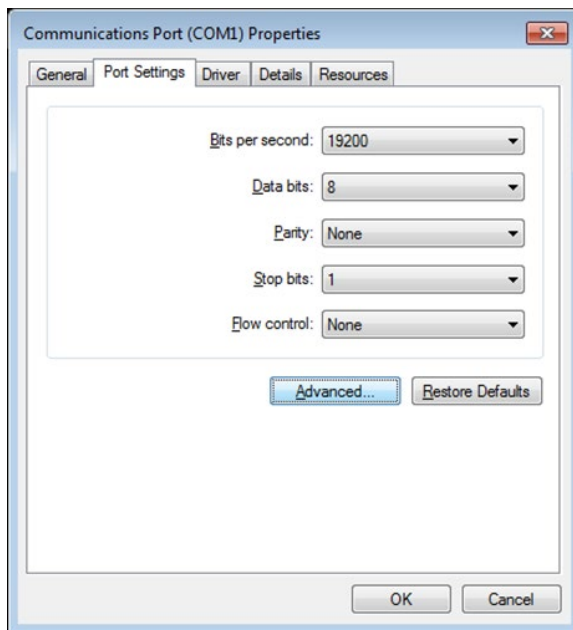
- Check if the **GS.POWERSITE.PSG.HR** folder and sub files are properly installed in the following path.
  - C:\Program files\WVXvue\GENERATOR\Protocol\GS.POWERSITE.PSG.HRW

### 3.26.2 How to Set Port from PC

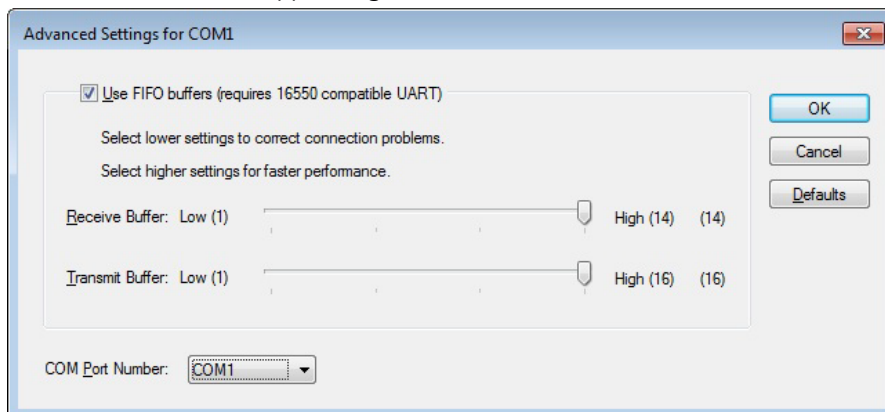
- Run **Device Manager** by selecting one of the two steps as follows.
  - **Control Panel → System and Security → Select System → Device Manager**
  - **Start → Input Device Manager to Windows Search**
- Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then, choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




- 4 Click the **OK** button after appointing **COM Port Number** to be used.

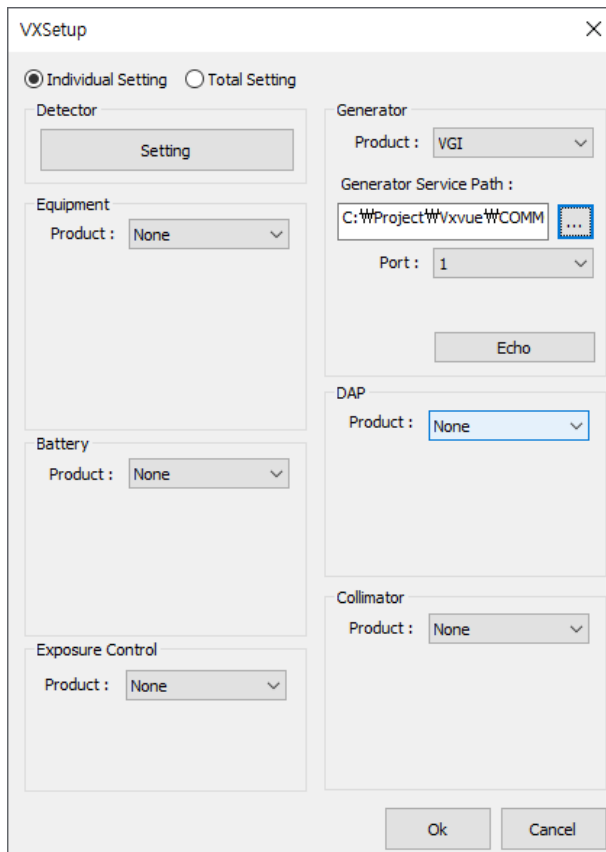


- Input or choose the configured COM port number when setting generator in VXSetup.

### 3.26.3 How to Set POWERSITE.PSG.HR Generator in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
  - 2 Set each item of the **Generator** menu as follows:
    - Product: VGI
    - Port: COM port number set on the PC. (Refer to <3.26.2 How to Set Port from PC>.)
  - 3 Click  button to input the path of GS.POWERSITE.PSG.HR.exe (Generator Service) prepared in <3.26.1 Installing GS>.
- Ex.) C:\Program files\VXvue\GENERATOR\Protocol\ GS.POWERSITE.PSG.HR\GS.POWERSITE.PSG.HR.exe
- 4 Click the **Echo** button to check the connecting status.



- 5 Click **OK** button to save and finish the settings.



- Check if the PC and generator are connected correctly with a cable (RS-232c) before setting items of generator in VXSetup.

**VXvue**

- The POWERSITE.PSG.HR generator is integrated directly with VXvue and VGI.
- Refer to <**3.1.1 Generator Interlock setting**> for details on the generator's Integration method and Configuration file (xml).

- You can **substitute Receptor(Bucky) icon for** the Detector icon shown in the Exposure tab from **VXvue** to install Detector.



- For more detail on replacing the Receptor icon, refer to <**3.1.2 How to Use Generator in VXvue**>.

- **VXvue** has a feature that automatically selects the device mapped with the selected device by mapping Receptor(Bucky) and Detector installed in the Receptor.



- For more information on mapping Receptor and Detector, refer to <**3.1.2 How to Use Generator in VXvue**>.

### 3.26.4 How to Set Generator in Procedure Manager in VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms / Focal Spot** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	Focal Spot
Abdomen Erect	Large	Current	50	1	100	10	Current
Abdomen Erect	Medium	Current	50	1	100	10	Current
Abdomen Erect	Small	Current	50	1	100	10	Current
Abdomen Erect	Pediatric	Current	50	1	100	10	Current
Abdomen KUB	Large	Current	50	1	100	10	Current
Abdomen KUB	Medium	Current	50	1	100	10	Current
Abdomen KUB	Small	Current	50	1	100	10	Current
Abdomen KUB	Pediatric	Current	50	1	100	10	Current
Abdomen Supine	Large	Current	50	1	100	10	Current
Abdomen Supine	Medium	Current	50	1	100	10	Current
Abdomen Supine	Small	Current	50	1	100	10	Current
Abdomen Supine	Pediatric	Current	50	1	100	10	Current



- If 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If a value other than **Current** is selected in **Dose Mode**, it is automatically converted to the set **Dose Mode** when **Step** is selected.

### 3.26.5 How to Use POWERSITE.PSG.HR Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.



- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port settings, etc.)


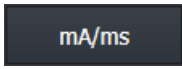






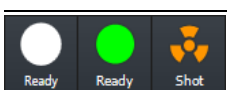
- You can perform the following functions.
  - Using **AEC** function
  - Adjusting **kVp** and **mAs**

▫ Adjusting **mA** and **ms** instead of **mAs**

Items	Image							
2 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
3 points	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼
AEC	70	kVp	▲	▼	20	mAs	▲	▼
	200	mA	▲	▼	100	ms	▲	▼

### Icons

The icons disabled in UI are not the supported ones when the viewer is integrated with the **POWERSITE.PSG.HR** generator.

Icon	Name	Description
	<b>mAs</b>	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	<b>mA/ms</b>	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	<b>AEC</b>	Enable to apply <b>AEC</b> functions.
	<b>AEC Field</b> (Left / Center / Right)	Select an <b>AEC</b> field to use. • Default setting: <b>Center</b> Enable to select multiple <b>AEC</b> fields.
	<b>Density</b>	Enable to adjust the density of <b>AEC</b> .
	<b>Focal Spot Size</b> (Small / Large)	Focal Spot Size is changed automatically depending on the <b>mA</b> setting of generator, or the user can change it manually.
	<b>Reset</b>	When a soluble error occurs by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. • Click this icon at this time to start reset.
	<b>Heat Units</b> (Anode)	The color of icon changes according to the heat units. • 0<HU≤50: Green • 50<HU≤80: Yellow • 80<HU: Red
	<b>X-ray Status</b>	The icons and their color are changed depending on the status of generator.

- Ready (White) - Standby
- Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.
- Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about the **VXvue**.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

### 3.26.6 Error and Warning Messages of POWERSITE.PSG.HR Generator



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable Error: The Reset button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

Code	Error Message
1	Generator CPU Real Time Clock Error
2	Main Contactor Error
3	Rotor Fault
4	DC Bus Voltage too Low
5	DC Bus Voltage too High
6	Filament Adjust Error
7	Filament Power Board Not Connected
8	Filament Short Circuit
9	Filament Overcurrent
10	Anode Overcurrent
11	Cathode Overcurrent
12	Anode Overvoltage
13	Cathode Overvoltage
14	ARC
15	Short Current 1
16	Short Current 2
17	Short Current A

18	Short Current B
100	AEC Backup ms Exceeded Exposure Terminated
101	AEC Backup mAs Exceeded Exposure Terminated
102	Door Interlock Error
103	Calibration Data Corrupt Error
104	AEC Data Corrupt Error
105	Workstation Data Corrupt Error
106	Tube Data Corrupt Error
108	mA Calibration Data Corrupt Error
109	Workstation Not Enabled Error
110	AEC Feedback Error No Feedback Signal Detected
111	EXP_SW Signal Active in Standby State
112	Calibration Error No mA
113	Calibration Error Maximum Filament Current Exceeded
114	MA During Exposure too High
115	MA During Exposure too Low
125	Parameter Limit
126	Manually Terminated Exposure
127	Preparation Timeout Error
128	Prep Input Active During Initialization Phase
129	X-ray Input Active During Initialization Phase
130	No Fields Selected in AEC mode
131	Generator AEC Density Limit
132	Calibration Error Manually Terminated
133	EEPROM Communication Error
134	RTC Communication Error
135	AEC Channel Error
136	Anode Communication Error
139	MOSFET Temperature Limit Exceeded
140	HU Power Limit
142	Small Focus Disable
143	Large Focus Disable
144	Low Speed Disable
145	High Speed Disable
146	Anode Heat Warning Exceeded
147	Anode Heat Limit Exceeded
148	KV Unbalance
149	Emergency Error
150	SF Feedback High In Standby
151	KV Calibration Data Corrupt Error
152	Generator Tank Power Limit

153	AEC Standby Signal Error
154	DCBUS Calibration Data Corrupt Error
155	Fluoro Timer Terminated
156	Fluoro Input Active During Initialization Phase
157	Power Off In X-Ray State
158	DAP Data Corrupt
159	Auto APR Timeout
160	ERR_FLUORO_ABSFDBNONE
9999	Generator Disconnected

### Warning Messages

Code	Warning Message
116	Generator KW Limit
117	Generator KV Limit
118	Generator MA Limit
119	Generator MS Limit
120	Generator MAS Limit
121	Tube KW Limit
122	Tube KV Limit
123	Tube MA Limit
124	Tube MAS Limit
137	EXP_OK TimeOut
138	KV TimeOut
141	HU Power Warning

## 4. Collimator

Collimator is the medical equipment for minimizing the X-ray exposure dose by limiting the direction and diffusion of radiation. You can select one of the following integrations with VXvue and then adjust or set the collimator to use.

### 4.1 Common Settings for Collimator

#### 4.1.1 Collimator Interlock Setting

##### Integration method – Direct

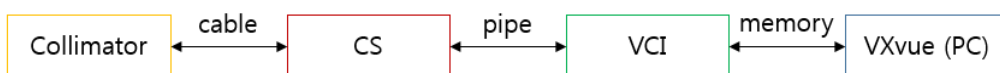


- Use the collimator module file included in VXvue to communicate directly with the cable between your PC and the collimator.
- Commands and data required for integration comply with the collimator protocol.



- In some cases, module files communicate with control programs or SDK made by generator manufacturers.

##### Integration method -VCI



- It uses the interface (VCI) included in VXvue to communicate with the collimator control program (CS). CS communicates directly with the collimator.
  - Ex) Ralco R225ACS collimator integration – Installing CS and setting up in VXSetup.
- VCI stands for 'Vieworks Collimator Interface' and is a communication protocol of Vieworks.
  - For more information about the protocol and VCI protocols, please contact a Vieworks representative.
- CS is a Collimator Service, which is middleware between VCI and collimator.
  - Commands and data necessary for integrating between CS and collimator comply with protocol specification of Integration collimator.
  - Commands and data required for integrating between CS and VCI comply with the VCI protocol.

### 4.1.2 How to Set Collimator from VXvue

You can preset the image crop size from **Collimation**.



- When interlocking an equipment to VSI (Vieworks System Interface), **Setting – Generator Menu** is not displayed. For more information, please contact to Vieworks.

#### Collimation Setting

- Set the conditioning value of Collimator.
  - You can set the values by going to **Setting mode → Integration → Collimation** in **VXvue**.
  - The minimum and maximum values of **Collimation** are **3 x 3** and **19 x 19**. But, when linking Collimator to VXvue, the value lower than **8 x 8** is not displayed on Exposure mode.
  - The minimum and maximum values of SID are **50** and **200**.
  - Filter** should be made up to 4 types. Name can be edited.

Collimation

Collimation

W	H	Description
8	10	
10	12	
12	10	
11	14	

Add

Delete

Up

Down

SID

SID

Name	SID
SID 100	100
SID 150	150
SID 180	180

Add

Delete

Up

Down

Filter

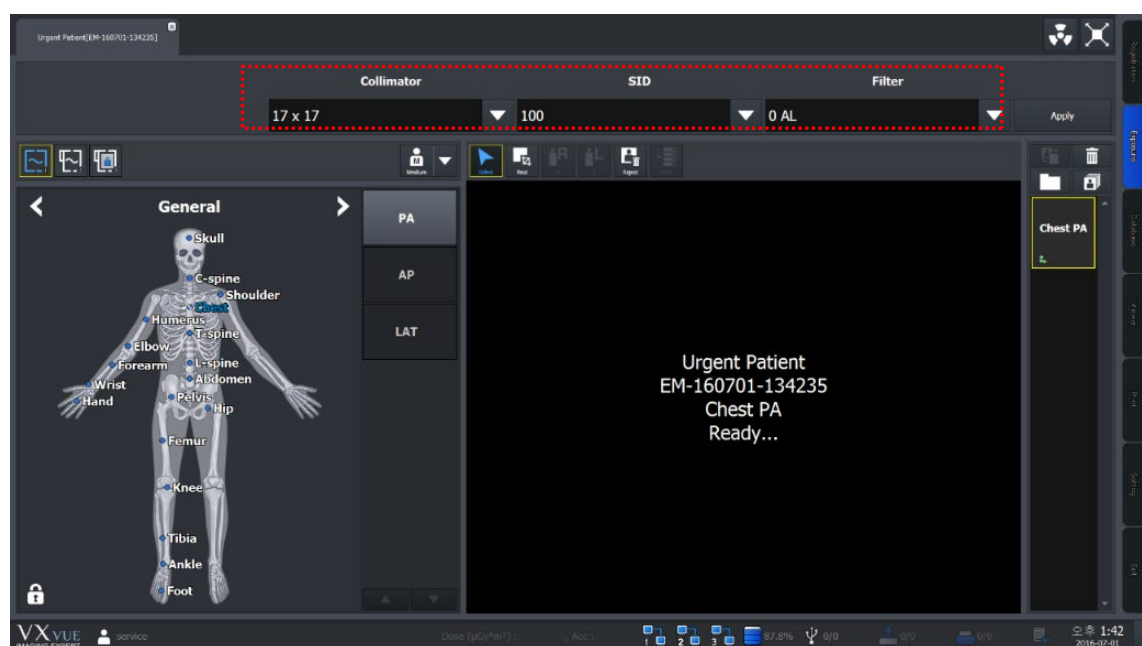
Filter

Position	Name
0	0 AL
1	1 AL 0.1Cu
2	1 AL 0.2Cu
3	1 AL

#### Checking Coordination Area of Collimator

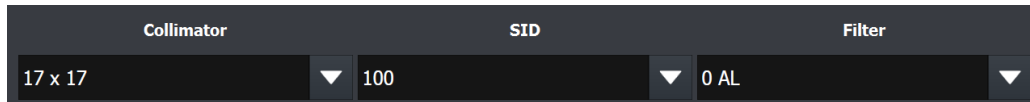
Once Collimator setting is completed, check the coordination area of Collimator on **Exposure** mode.

- Values of **Collimator** / **SID** / **Filter** shown in coordination area is defined according to Steps.

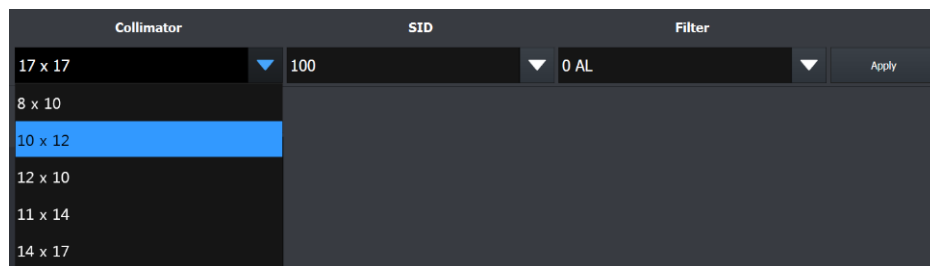


## Collimator Setting

- 1 Select **Bodypart / Projection (Step)** in the selecting area of exposure step on **Exposure** mode in Vxvue.
  - Check if the values of **Collimator / SID / Filter** are automatically changed to the configured value in the relevant Step.



- 2 To manually change values, choose the value you want from the list of **Collimator / SID / Filter** and click the **Apply** button.
  - Each value can be configured from **Setting** mode → **Integration** → **Collimation**.



## Software Collimation (Crop Option) Setting

- 1 Preset the image crop size by going to **Setting** mode → **Integration** → **Collimation**.
  - Predetermined values are used as conditioning value for Collimator when linked to Collimator and used for crop option on **Crop** menu.
    - Crop Option is usable even when being out of the range of Collimator linkage. (E.g., 3 x 17)
  - Check the below popup menu when cropping an image on **Exposure** mode and **Viewer** mode in **VXvue**.  
Popup menu appears when right clicking the image on Crop mode.

Crop Option Setting	Crop Option

2 Register the crop size of the image by clicking the Add button.

- **W** (Width) and **H** (Height) are registered to 10 and 12. To change sizes, double click **W** or **H** value.

W	H
8	10
10	12
12	3
11	4
7	5
14	6
	7
	8
	9
	10
	11
	12
	13
	14
	15
	16
	17

3 Click **Up** or **Down** button to adjust orders of the item.

4 Click the **Delete** button after selecting the item to delete it.

### SID Setting

The predetermined **SID** values are available only when the Viewer is linked to Collimator.

- You can adjust Collimator by sending **SID** values to Collimator.
- When linked to U-ARM, **SID** value of U-ARM is used.

1 Add items by clicking the **Add** button.

SID			
Name	SID		
SID 100	100	Add	
SID 150	150	Delete	
SID 180	180	Up	
		Down	

2 Double click the value of each item to edit Name or SID value.

3 Click the Up or Down button to adjust order of the item.

4 Delete the item by clicking the Delete button.

## Filter Setting

The predetermined **Filter** values are available only when the Viewer is linked to Collimator.

- You can adjust Collimator by sending **Filter** values to Collimator.
- Double click the **Name** value of the desired item to edit.

### 4.1.3 How to Set Collimator from Procedure Manager

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose Collimator Width / Collimator Height / Collimator SID / Collimator Filter columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.

Name	Patient	Collimator Width	Collimator Height	Collimator SID	Collimator Filter
Abdomen Erect	Large	17	17	100	0
Abdomen Erect	Medium	8	17	100	0
Abdomen Erect	Small	9	17	100	0
Abdomen Erect	Pediatric	10	17	100	0
Abdomen KUB	Large	11	17	100	0
Abdomen KUB	Medium	12	17	100	0
Abdomen KUB	Small	13	17	100	0
Abdomen KUB	Pediatric	14	17	100	0
Abdomen Supine	Large	15	17	100	0
Abdomen Supine	Medium	17	17	100	0
Abdomen Supine	Small	17	17	100	0
Abdomen Supine	Pediatric	17	17	100	0



- If **Collimator** is selected among the buttons at the top of the **Step** tab, only the collimator-related settings are displayed.
- The predetermined value of a **Crop** function is used when not linked to Collimator.

## 4.2 RALCO R302DACS

### Interlock Condition

R302DACS is integrated directly with VXvue and uses CAN (Controller Area Network) communication method.

### 4.2.1 Preparing Integration

Be sure to use **USB to CAN Compact** provided by **IXXAT** for carrying out the **CAN** communication with the collimator of **RALCO**.

- Install the driver of **USB to CAN Compact** (V3.5.1) and connect the hardware.



- If the driver version of **USB to CAN Compact** is different, the collimator cannot be integrated with **VXvue**.

### 4.2.2 How to Set RALCO R302DACS Collimator in VXSetup

#### VXSetup

Select RALCO R302DACS Collimator and input Information

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of **Collimator** as follows;
  - **Product:** RALCO / **Model:** R302DACS

The screenshot shows the VXSetup dialog box with the 'Individual Setting' tab selected. The 'Collimator' section is expanded, showing 'Product' set to 'RALCO' and 'Model' set to 'R302DACS'. Other sections include 'Detector' (Setting button), 'Equipment' (Product: None), 'Battery' (Product: None), 'Exposure Control' (Product: None), 'Generator' (Product: None), and 'DAP' (Product: None). The 'Ok' and 'Cancel' buttons are at the bottom right.

3 Click **OK** button to save the settings.



- You can use the virtual collimator for testing without connecting the product and the collimator. In other words, it is available to use **VXvue** and control the collimator by selecting the product and the collimator model in VXSetup without integrating the real hardware.

### VXvue

- VXvue supports a Software Collimation/SID/Filter setting, which edits images by desired sizes from Exposure and Viewer tab in Vxvue.



- For more information on collimator setting in **VXvue**, refer to <4.1.2 How to Set Collimator from VXvue>.

- Procedure manager provides a function that configures collimator by Step.



- For more information on collimator setting in Procedure manager, refer to <4.1.3 How to Set Collimator from Procedure Manager>.

## 4.3 RALCO.R225.ACS

### Interlock Condition

**R225.ACS** is integrated directly with VXvue via VCI, and uses CAN (Controller Area Network) communication method.

### 4.3.1 Preparing Integration

Be sure to use **USB to CAN Compact** provided by **IXXAT** for carrying out the **CAN** communication with the collimator of **RALCO**.

- Install the driver of **USB to CAN Compact** (V4.0.xxx) and connect the hardware.



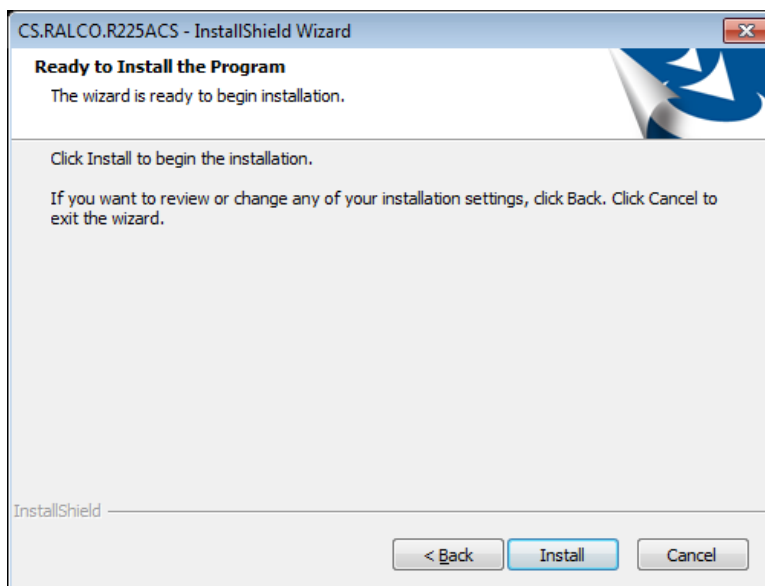
- If the driver version of **USB to CAN Compact** is different, the collimator cannot be integrated with **VXvue**.

### 4.3.2 How to Install CS

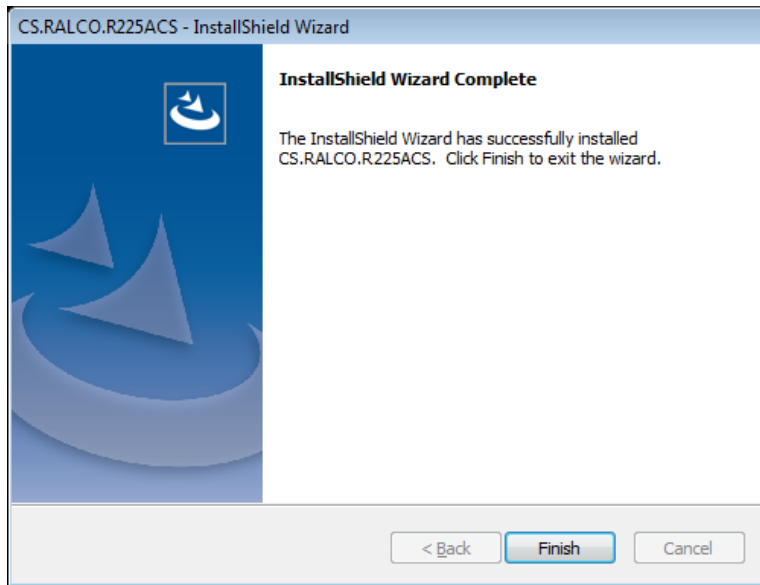


- To use **Ralco.R225.ACS** collimator, you must install **CS.RALCO.R225.ACS.Setup.exe** separately. If you need the installation file, please contact a person in charge in Viewworks.

- 1 Install VXvue.
  - Run the CS.RALCO.R225.ACS.Setup.exe file in administrator mode.
- 2 Click the Install button to start installation.



- 3 When the installation is complete, click the **Finish** button.



- 4 After the installation is complete, check that the CS.RALCO.R225.ACS folder and sub files are installed normally in the following path.

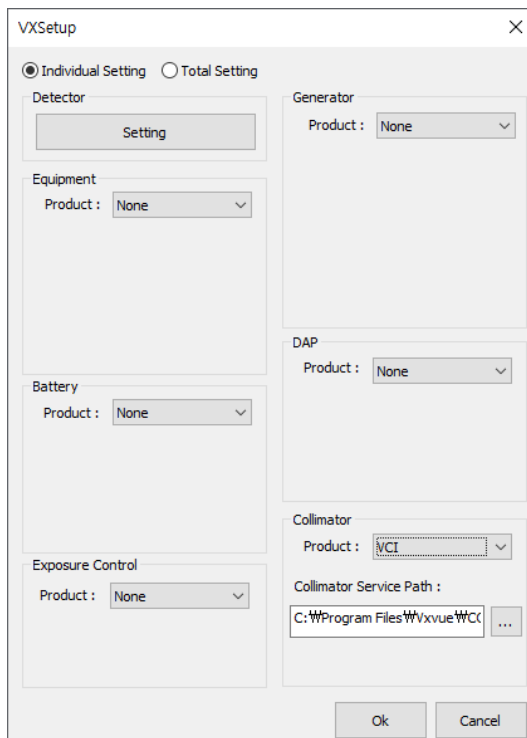
▫ C:\Program files\WVXvue\WCOLLIMATOR\WCS.RALCO.R225.ACS\W

### 4.3.3 How to Set RALCO.R225.ACS Collimator in VXSetup

#### VXSetup

- 1 Run VXSetup and click the Individual Setting button.  
2 Set each item of Collimator as follows:

▫ **Product:** VCI



- 3 Click  button and enter the path of CS.RALCO.R225.ACS.exe (Collimator Service) prepared in <4.3.2 How to Install CS>.

▫ Ex.) C:\Program files\WVXvue\WCOLLIMATOR\WCS.RALCO.R225.ACS\WCS.RALCO.R225.ACS.exe

- 4 Click **OK** button to save the settings.



- Before you set items of collimator in VXSetup, check if the collimator is connected to the PC normally.

### VXvue

- The RALCO R225.ACS collimator is integrated with VXvue via VCI.



- Refer to the front part of the <4.1.1 Collimator Interlock Setting> for details on the Integration method of collimator.

- VXvue supports a Software Collimation/SID/Filter setting, which edits images by desired sizes from Exposure and Viewer tab in Vxvue.



- For more information on collimator setting in **VXvue**, refer to <4.1.2 How to Set Collimator from VXvue>.

- Procedure manager provides a function that configures collimator by Step.



- For more information on collimator setting in Procedure manager, refer to <4.1.3 How to Set Collimator from Procedure Manager>.

## 4.4 VAREX.OPTICA

### Interlock Condition

VAREX.OPTICA works with VXvue through VCI and uses CAN (Controller Area Network) communication method.

### 4.4.1 Preparing Integration

Be sure to use **USB to CAN Compact** provided by **IXXAT** for carrying out the **CAN** communication with the collimator of **Varex**.

- Install the driver of **USB to CAN Compact** (V4.0.xxx) and connect the hardware.



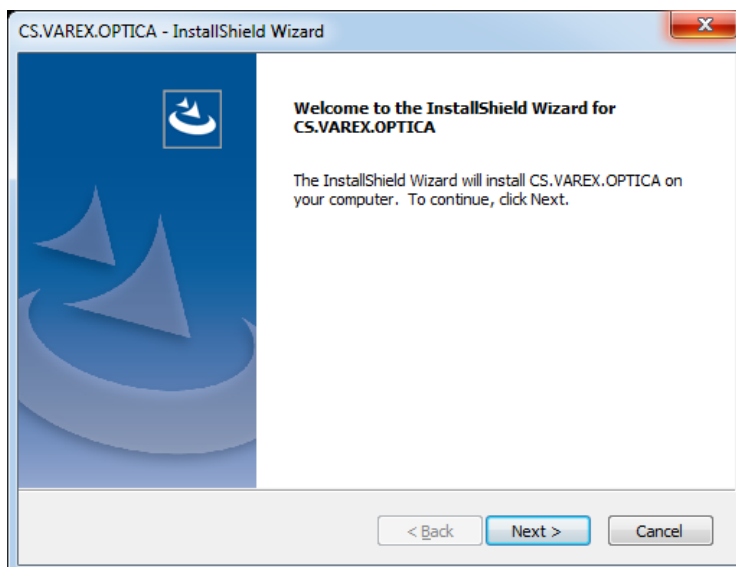
- If the driver version of **USB to CAN Compact** is different, the collimator cannot be integrated with **VXvue**.

### 4.4.2 Installing CS

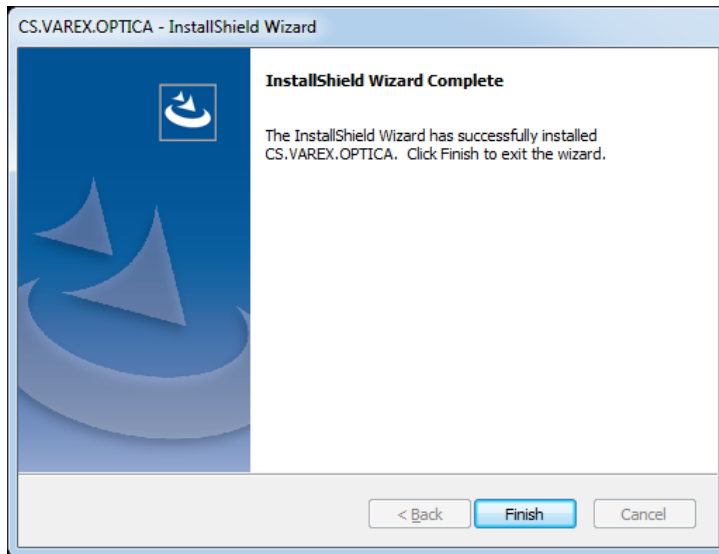


- To use Varex Optica collimator, you need to install CS.VAREX.OPTICA.exe separately. If you need the corresponding installation files, please contact a person in charge in Viewworks.

- 1 Install VXvue.
- 2 Run CS.VAREX.OPTICA.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the **Finish** button.



- 5 After the installation is complete, check that the CS.VAREX.OPTICA folder and sub files are installed normally in the following path.

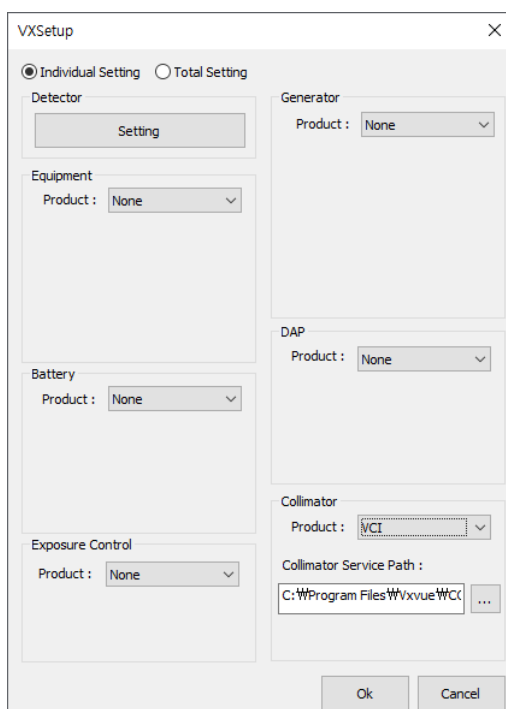
▫ C:\Program Files\WVXvue\COLLIMATOR\CS.VAREX.OPTICA\

#### 4.4.3 How to Set VAREX.OPTICA Collimator in VXSetup

##### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of **Collimator** as follows:

▫ **Product:** VCI



3 Click the button and enter the path of CS.VAREX.OPTICA.exe (Collimator Service) prepared in <4.4.2 Installing CS>.

▫ Ex) C:\Program files\VXvue\COLLIMATOR\CS.VAREX.OPTICA\CS.VAREX.OPTICA.exe

4 Click **OK** button to save the settings.



- Before setting the collimator in VXSetup, check if the PC and collimator are properly connected.

### VXvue

- Varex Optica collimator works with VXvue through VCI.



- For the collimator Integration method, refer to the front part of <4.1.1 Collimator Interlock Setting>.

- VXvue supports a Software Collimation/SID/Filter setting, which edits images by desired sizes from Exposure and Viewer tab in Vxvue.



- For more information on collimator setting in **VXvue**, refer to <4.1.2 How to Set Collimator from VXvue>.

- Procedure manager provides a function that configures collimator by Step.



- For more information on collimator setting in Procedure manager, refer to <4.1.3 How to Set Collimator from Procedure Manager>.

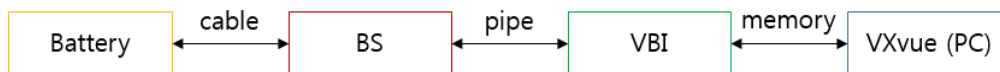
## 5. Battery (UPS)

Battery (UPS) is a device that provides stable AC power to connected medical equipment such as generators and PC by delivering commercial power in an uninterruptible mode. The user can link the VXvue and the battery (UPS) and display the remaining power in real time, or turn off the VXvue and the system according to the power.

### 5.1 Common Settings for Battery

#### 5.1.1 Battery Interlock Setting

**Integration method – VBI**



- It uses the interface (VBI) included in VXvue to communicate with the battery control program (BS). BS communicates directly with UPS.
  - Ex) Riello UPS integration – Installing BS and setting up in VXSetup.
- VBI stands for 'Vieworks Battery Interface' and is a communication protocol of Vieworks.
  - For more information about the protocol and VBI protocols, please contact a Vieworks representative.
- BS stands for 'Battery Service' and is middleware between VBI and battery (UPS).
  - Commands and data necessary for integrating between BS and battery (UPS) comply with the protocol specifications of battery.
  - Commands and data required for integrating between BS and VBI comply with the protocol specifications of VBI.

#### 5.1.2 How to Use Battery in VXvue

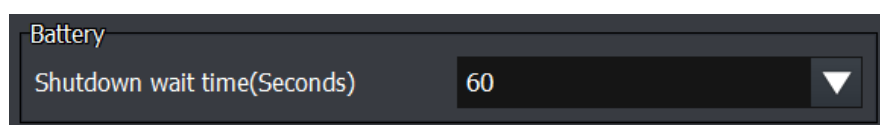
Values for battery use can be configured when linked to an external battery(E.g. UPS).



- Setting – Battery is not displayed when interlocking the device to VSI (Vieworks System Interface). For more information, please contact to Vieworks.

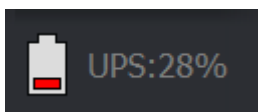
#### Shutdown wait time

Set the waiting time until the power shuts down by going to **Setting** mode → **Integration** → **Battery** panel when a battery level goes below the predetermined threshold value.








### Checking Remaining Battery Level

You can check the remaining battery level(UPS) in the lower right-hand corner of the status bar.



The icon image changes according to selected options.

- The warning sign pops up when the battery level goes down to 30%.
- When the battery level goes down to 15%, the warning sign pops up and the system is shut down after the configured waiting time.

Icon	Battery level
	91~100%
	66~90%
	36~65%
	11~35%
	0~10%

## 5.2 Riello DVR500

This section explains about the integration between **VXvue** and the **Riello DVR500** battery (UPS) model.

### Interlock Condition

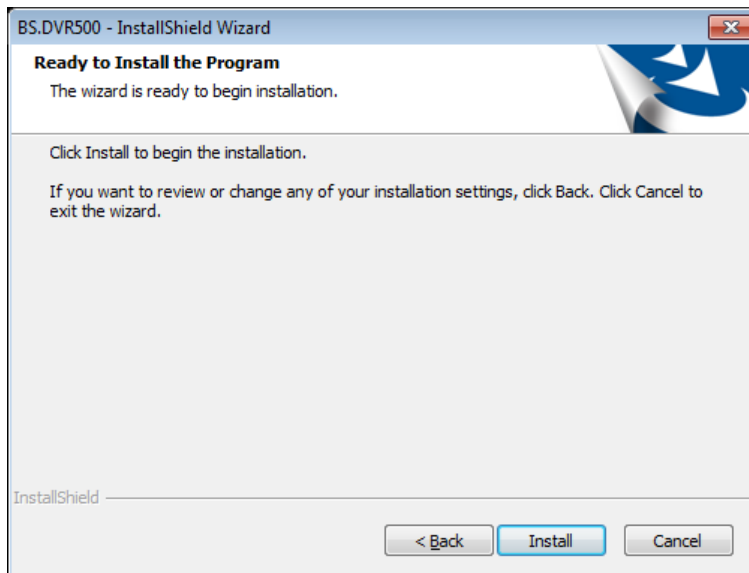
Complies with the communication standard of RS-232.

#### 5.2.1 How to Install GS

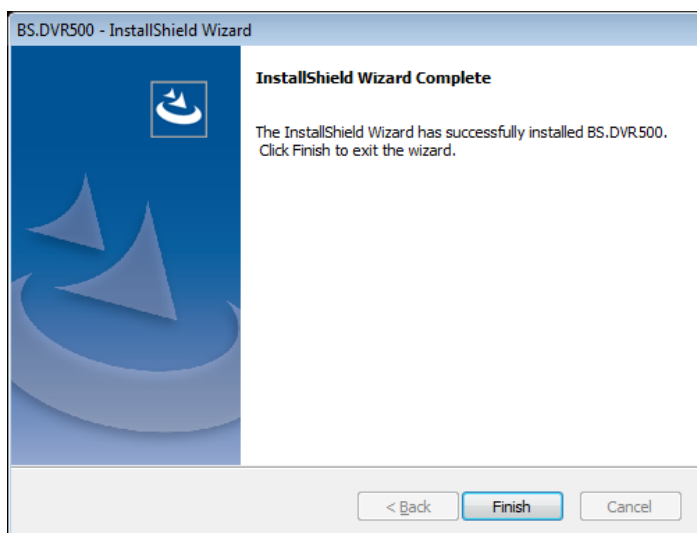


- To use **Riello DVR500** battery (UPS), you must install **BS.DVR500.Setup.exe** separately. If you need the installation file, please contact a person in charge in Vieworks.

- 1 Install VXvue.
- 2 Run the BS.DVR500.Setup.exe file in administrator mode.
- 3 Click the Install button to start installation.



- 4 When the installation is complete, click the Finish button.

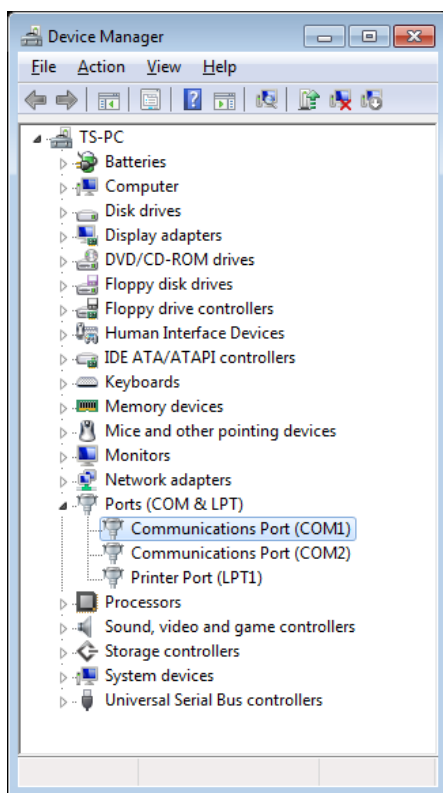


- 5 After the installation is complete, check that the BS.DVR500 folder and sub files are installed normally in the following path.

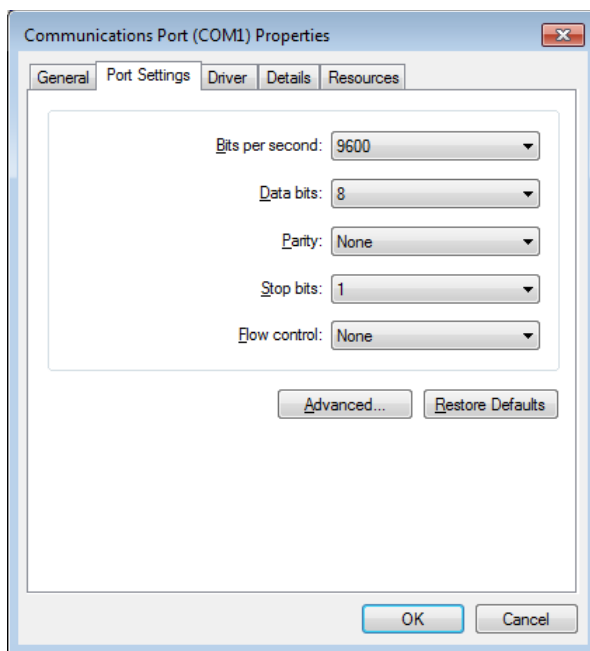
▫ C:\Program files\WVXvue\Battery\Protocol\BS.DVR500\

### 5.2.2 How to Set Port from PC

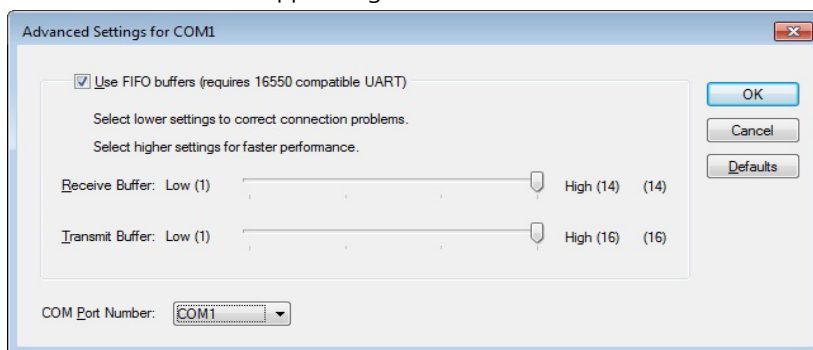
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




4 Click the **OK** button after appointing **COM Port Number** to be used.

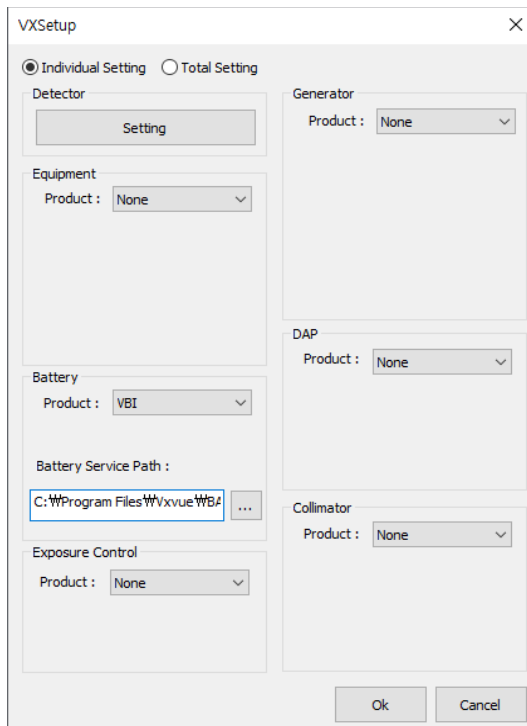


- Input or choose the configured COM port number when making settings about the battery (UPS) in VXSetup.

### 5.2.3 How to Set Riello DVR500 Battery in VXSetup and VXvue

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Set each item of **Battery** as follows:
  - Product: VBI
  - Port: COM port number configured from PC. (Refer to <5.2.2 How to Set Port from PC>)
- 3 Click  button and enter the path of BS.DVR500.exe (Battery Service) prepared in <5.2.1 How to Install GS>.
  - Ex.) C:\Program files\WVXvue\WBattery\WProtocol\WBS.DVR500\WBS.DVR500.exe
- 4 Click the **Echo** button to check the connection status.



5 Click the **OK** button to save the settings.



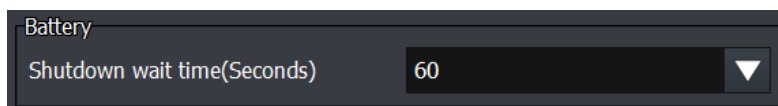
- Before you set items of battery (UPS) in VXSetup, check if the battery (UPS) is connected to the cable (RS-232c) normally.



- The Riello DVR500 battery (UPS) is integrated with VXvue via VBI.
- Refer to <5 Battery (UPS)> for details on the Integration method of battery (UPS).

## VXvue

You can set the time until the VXvue and the system are powered off as follows in **Setting mode > Integration > Battery** of VXvue.



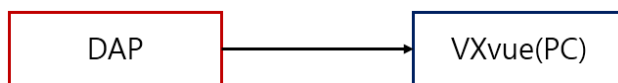
## 6. DAP

**DAP** (Dose Area Product) is the medical equipment for measuring the exact X-ray dose exposed per unit area. You can connect PC and **DAP** to read values in VXvue.

### 6.1 Common Settings for DAP

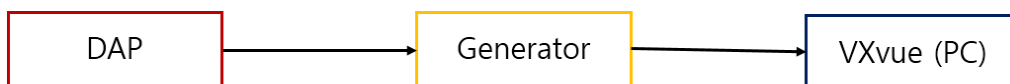
#### 6.1.1 DAP Interlock Setting

##### Direct Integration



- The DAP models that support direct integration with **VXvue** are as follows:
  - DIAMENTOR C2, DIAMENTOR E2 models from PTW
  - VacuDAP OEM, VAcuDAP Standard (with Display Unit) models from VacuTec.
- Contact the person in charge of Vieworks if a specific **DAP** model is needed for integration.

##### Indirect Integration



- **VXvue** and **DAP** indirectly communicate via the protocol supported by the **generator**.
- **Indirect integration** utilizes the settings connected to the generator, and DAP connection setting depends on the generator connection setting.
- Commands and data required for integrating between DAP and PC comply with the protocol specifications of VBI.



- Indirect integration is unavailable when the generator does not support DAP.
- For more information on supported DAP by the generator, please contact to the Vieworks manufacturer.

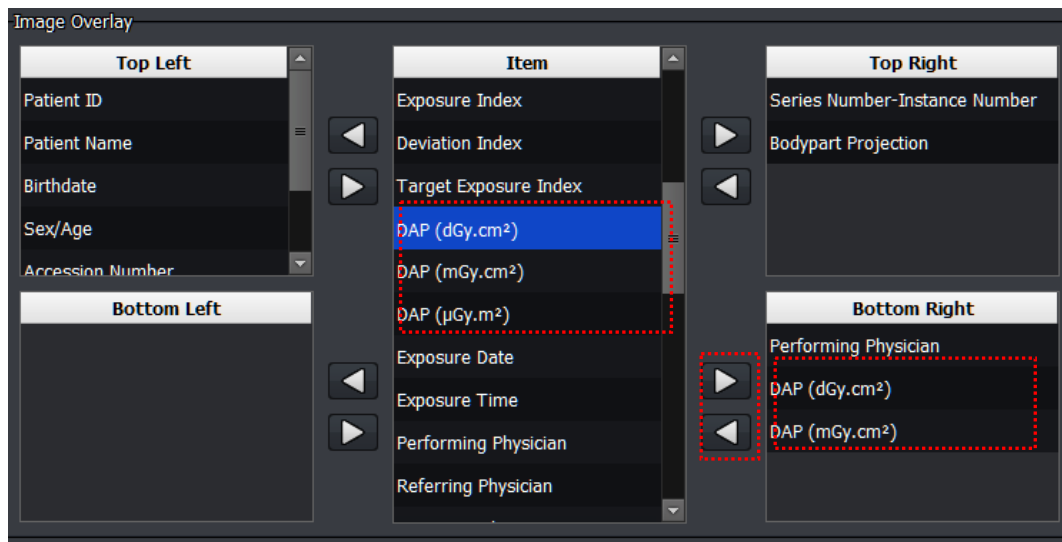
### 6.1.2 How to Specify the Location to Indicate DAP Value in VXvue



Specify the location from the **Setting** mode to check the **DAP** value in **VXvue**.

#### Indicating DAP Value to Image Overlay

1 Choose DAP (**dGy·cm<sup>2</sup>/mGy cm<sup>2</sup>/ uGy\*m<sup>2</sup>**) from the items of **Image Overlay**.

▫ Path: **Setting** mode → **Display** → **Information Overlay** panel



2 Add **DAP** value to the location (**Top**, **Bottom**, **Right**, **Left**) where indicating the value by using   buttons.



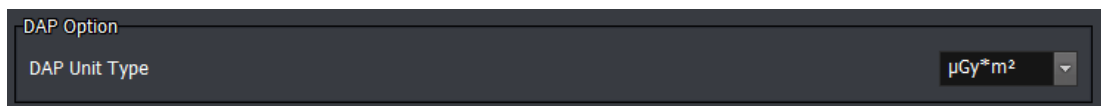
- Click the **Update** button at the left top of screen after appointing the location to indicate **DAP** value.

#### Indicate DAP Value to the Status Bar of VXvue

Choose the unit from **DAP Option**.

▫ Path: Setting mode → Integration → General panel

▫ Unit: mGy\*cm<sup>2</sup>, uGy\*m<sup>2</sup>, dGy\*cm<sup>2</sup>



### 6.1.3 How to Use DAP in VXvue

Check if the DAP value is indicated to the status bar at the bottom of the acquired image.

- Dose ( $\mu\text{Gy}\cdot\text{m}^2$ ): Exposure dose of the image
- Acc: Accumulated dose of the study



- The accumulated dose is not calculated if you take images under the **CR** mode.



- Refer to **VXvue Operation Manual** or **VXvue Service Manual** for the detailed information about Image Overlay.

## 6.2 PTW C2 / E2

The display units **DIAMENTOR C2** and **DIAMENTOR E2** from **PTW** support 2 channels and 1 channel each.

### Communication Standard

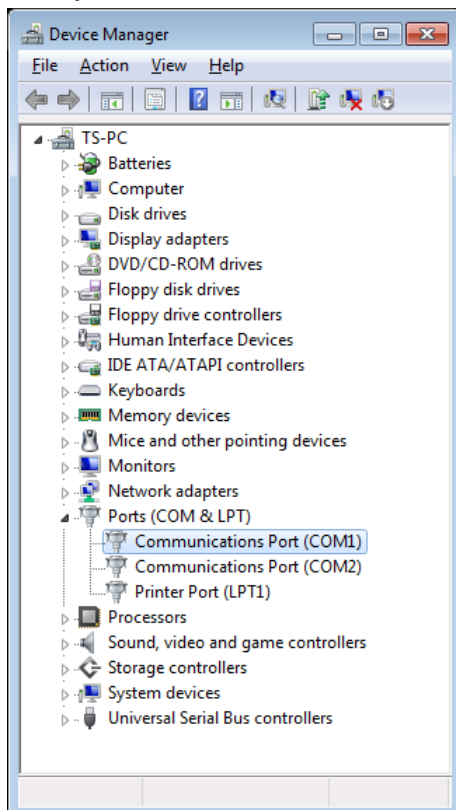
- Comply with the communication standard of RS-232.
- Available to connect all ion chambers of PTW.

### Integration Model

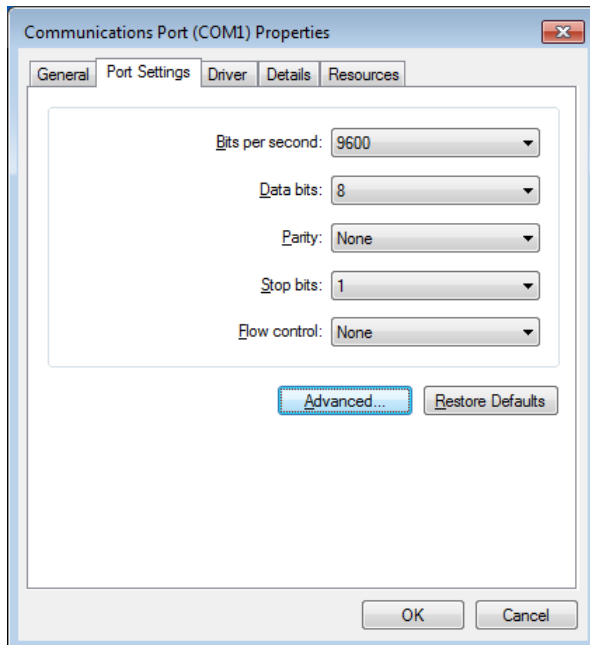
DIAMENTOR C2, DIAMENTOR E2

#### 6.2.1 How to Set Port from PC

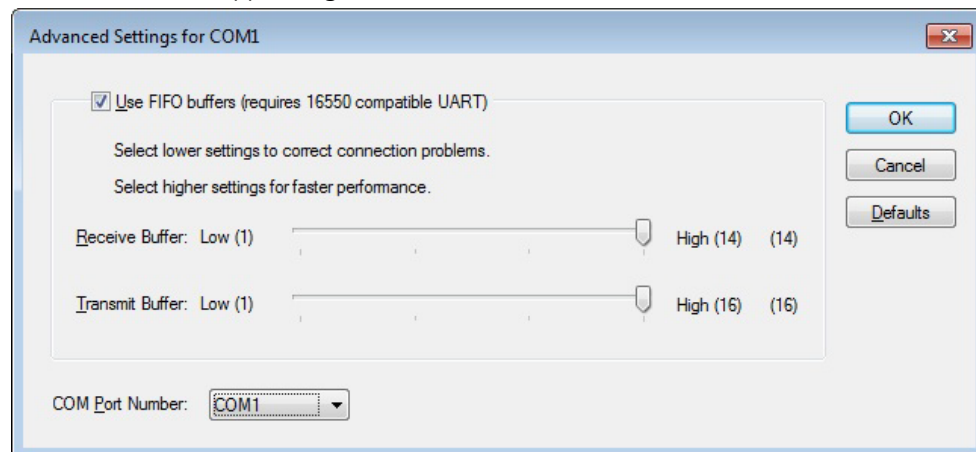
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



- 3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when setting DAP in VXSetup.

## 6.2.2 How to Set PTW C2/E2 in VXvue and VXSetup

### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Choose **PTW C2** or **E2** from the **Product** options in **DAP**.

VXSetup

☒ Individual Setting ☐ Total Setting

Detector

Setting

Equipment

Product : None

Battery

Product : None

Exposure Control

Product : None

Generator

Product : None

DAP

Product : PTW

Model : C2

Port : 1

Echo

Collimator

Product : None

Ok Cancel

- 3 Choose COM port number among the sub options (1~25) of **Port**.
  - Refer to <6.2.1 How to Set Port from PC>.

### VXvue



- For more information on DAP setting in VXvue, refer to <6.1.3 How to Use DAP in VXvue>.

## 6.3 VacuTec

This section explains about the direct integration process of **VXvue** and the OEM generator model, the ion chamber of **VacuTec**.

- The connectable number of ion chambers is different depending on the displayed unit.

### Integration Model

- VacuDAP OEM (Chamber, Part No. 156 00 15, 158 00 15)
- VacuDAP Standard (Display Unit, Part No. 943 00 01, 943 00 04/05)
- VacuDAP Bluetooth OEM (Chamber, Part No. 156 00 14, 158 00 14)
- VacuDAP Bluetooth (Display Unit, Part No. 943 00 06)

Compatible firmware version of Display Unit	Compatible Firmware version of Chamber (OEM)
V1.42 or higher	V1.601 or higher



- When you use Display Unit and Chamber, they may not be integrated with the viewer program if their firmware version is lower than the compatible one. Check the version of the equipment again before integration.

### Interlock Condition

- VacuDAP OEM - The **DAP** equipment and a connection line located at the right of the following image are required.
- VacuDAP Standard – The **DAP** equipment and a connection line located at the right of the following image as well as the display unit and **RS-232** cable at the left are required.



- VacuDAP Bluetooth OEM – The **DAP equipment** and a **connection line for Bluetooth** in the below picture are required.
- VacuDAP Bluetooth : The **DAP equipment**, **connection line**, the **display unit**, and **RS-232** cable for Bluetooth in the below picture are required.



### Communication Standard

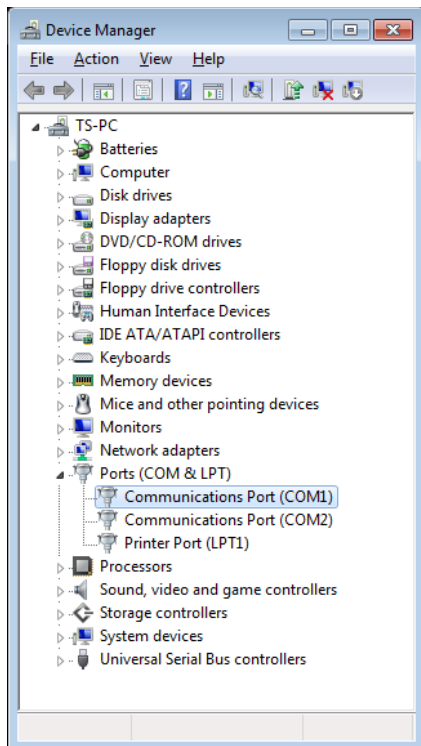
- VacuDAP OEM - Complies with the communication standard of RS-232.
- VacuDAP Standard – Needs the RS-232 cable that supports hardware flow control (RTS and CTS).
- VacuDAP Bluetooth OEM : Complies with Bluetooth Serial Port Profile.
- VacuDAP Bluetooth : Needs the RS-232 cable that supports hardware flow control (RTS and CTS).



- For purchasing RS-232 cable that supports Hardware Flow Control, contact VacuTec, a DAP manufacturer.

### 6.3.1 How to Set Port from PC

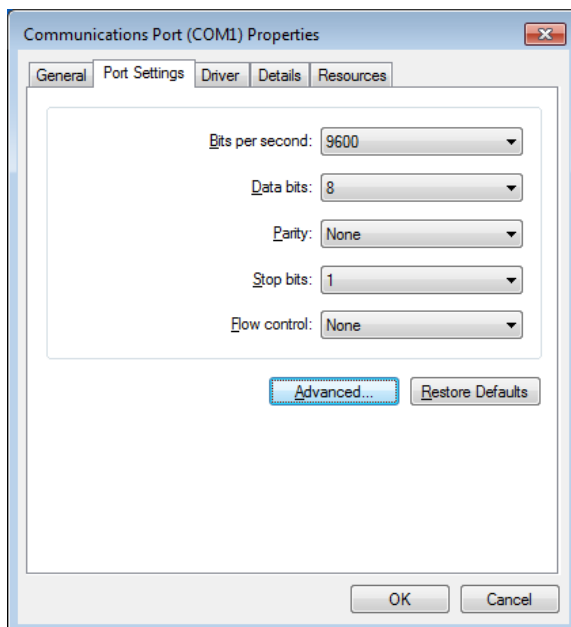
- 1 Run **Device** Manager by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.

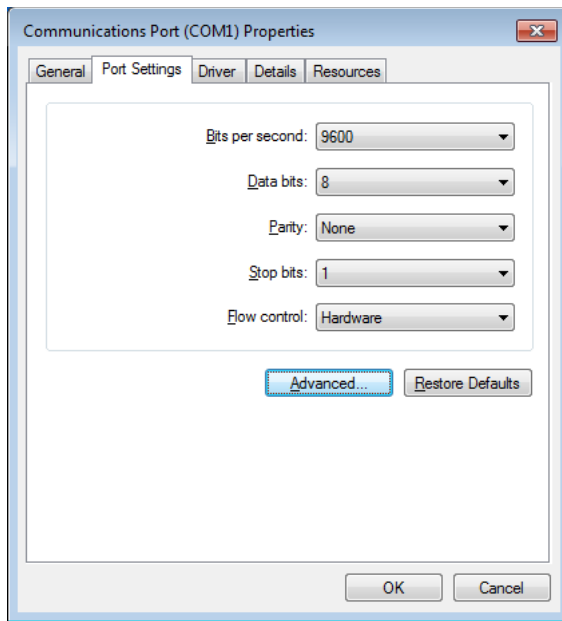
▫ VacuDAP OEM

▫ VacuDAP Bluetooth OEM



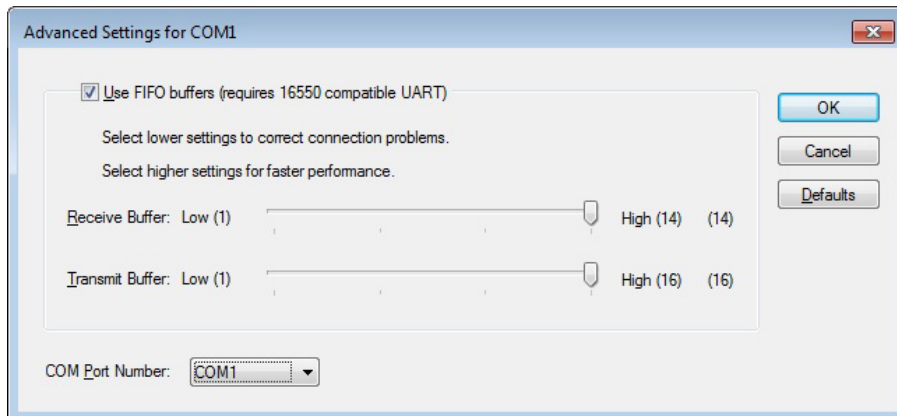
▫ VacuDAP Standard

▫ VacuDAP Bluetooth



- In case of **VacuDAP Standard** and Bluetooth models which use the display unit, it is necessary to set the **Flow control** option as '**Hardware**'.

4 Click **OK** button after appointing **COM Port Number** to be used.

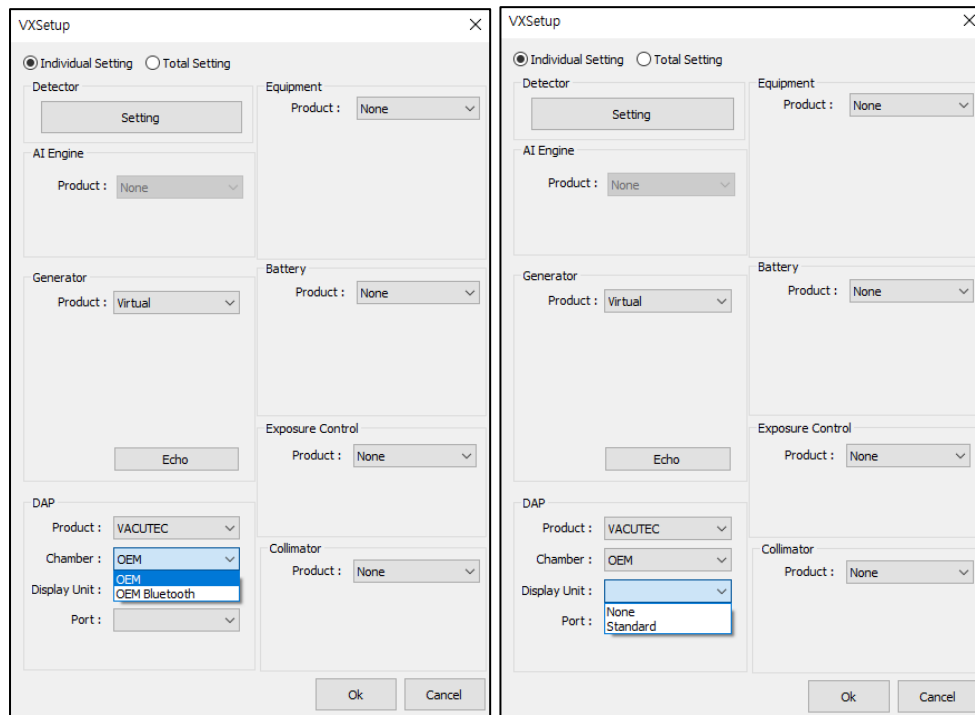


- Input or choose the configured COM port number when setting DAP in VXSetup.

### 6.3.2 How to Set VXvue and VacuTec in VXSetup

#### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Choose **Vacutec** from the **Product** options in **DAP**.
- 3 Select Chamber and Display Unit.



&lt;VacuDap Chamber Setting&gt;

&lt;VacuDap Display Unit Setting&gt;

4 Choose COM port number among the sub options (1~25) of **Port**.

▫ Refer to <6.3.1 How to Set Port from PC>.

## 6.4 DMC

You can integrate DAP manufactured by DMC with VXvue.

### Integration Model

Ray-Dose-VI

Compatible firmware version of Display Unit	Compatible Firmware version of DAP
1.0.0.86b22p5	XD-1.0001



- When VXvue and DAP are connected, they may not be interlocked if their versions are lower than compatible ones. Please double-check the version of each equipment before Integration DAP.

### Interlock Condition

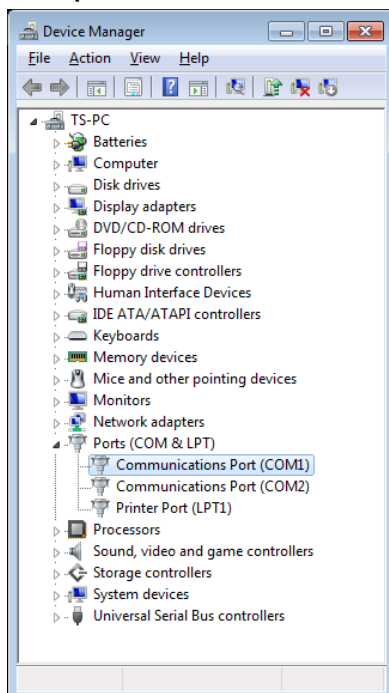
Requires DAP device (Ray-Dose-VI) and a connecting cable.

### Communication Standard

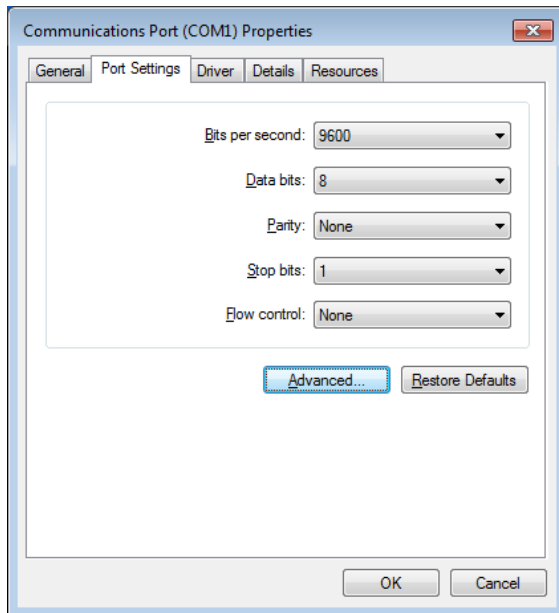
Complies with the communication standard of RS-232.

#### 6.4.1 How to Set Port from PC

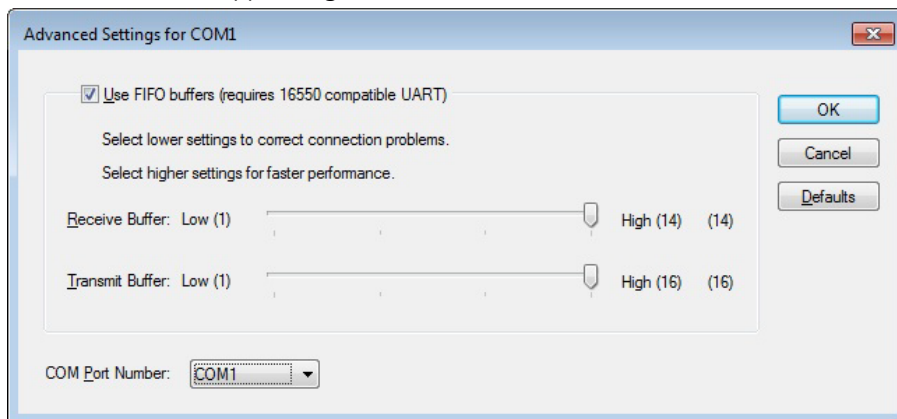
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



- 3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click **OK** button after appointing **COM Port Number** to be used.



- Input or choose the configured COM port number when setting DAP in VXSetup.

## 6.4.2 How to Set DMC in VXvue and VXSetup

### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Choose **DMC** from the **Product** options in **DAP**.

VXSetup

☒ Individual Setting ☐ Total Setting

Detector  
Setting

Equipment  
Product : None

Battery  
Product : None

Exposure Control  
Product : None

Generator  
Product : None

DAP  
Product : DMC  
Model : RAY DOSE VI  
Port : 1  
Echo

Collimator  
Product : None

Ok Cancel

3 Choose COM port number among the sub options (1~25) of **Port**.

▫ Refer to <6.4.1 How to Set Port from PC>.

## VXvue



- For the **Standard** model with **Display Unit**, you can check the accumulation dose and test and reset the value by clicking **Display Unit** button.



- For more information on DAP setting in VXvue, refer to <6.1.3 How to Use DAP in VXvue>.

## 6.5 IBA

You can use IBA's Ion Chamber KermaX-plus model with VXvue.

### Integration Model

- KermaX-plus TinO (Chamber, Part No. 120-131 TINO, 120-13111 HS/RS485, 120-131 MICROHS)

Compatible VXvue ver.	Compatible Firmware ver. of DAP
1.0.1.4p1	DDP-D 2.4



- When linking VXvue and DAP, it may not work if it is lower than the compatible version. Check the version of the equipment again before Integration.

### Integration Conditions

- KermaX-plus : Serial Requires a cable and converter, power pack or power cable for serial connection. Alternatively, you can use a USB converter. Use extension cable if necessary.

<b>RS485/RS232 Converter (Part No. 120104501#001)</b>
<b>[DAP] → Y-Connector + Power pack (Part No. 120805)</b> or Generator internal supply cable (Part No. 120800001) + AKP Cable (Part No. 120900) + <b>RS485 Converter → [PC]</b>

<b>USB Converter (Part No. 12080800)</b>
<b>[DAP] + USB Converter → [PC]</b>



- For installation of KermaX-plus, refer to the OEM manual provided by the manufacturer or contact the manufacturer.

### Communication Standards

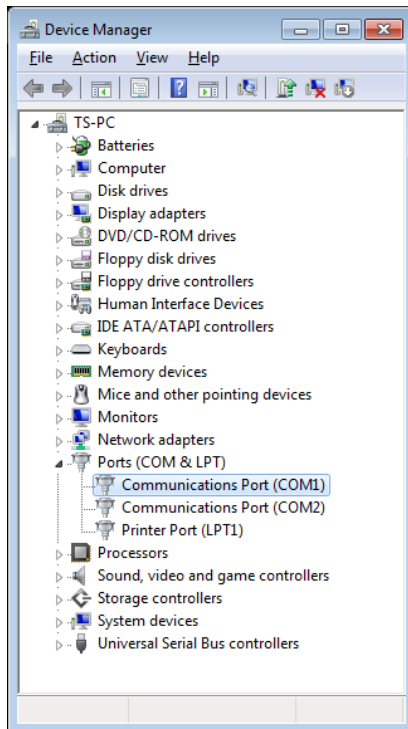
- Complies with the RS-232 / 485 communication standards.



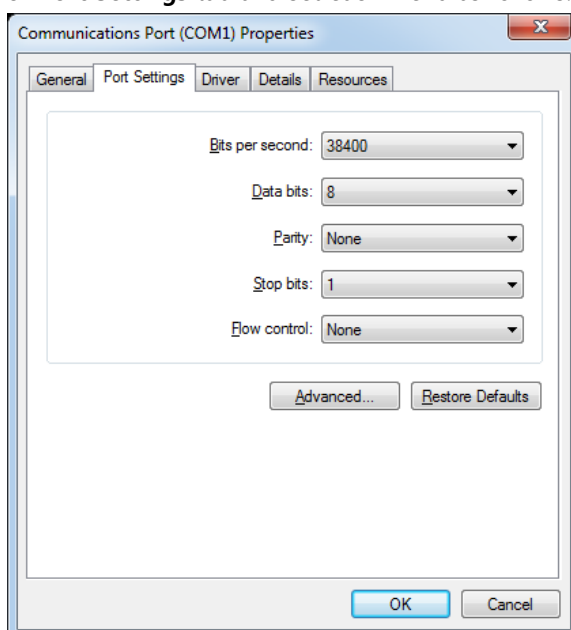
- Use the RS485 / RS232 Converter (Part No. 120104501 #001) or USB Converter for KermaX (Part No. 12080800) provided by the manufacturer for connecting KermaX-plus.

### 6.5.1 How to Set Port from PC

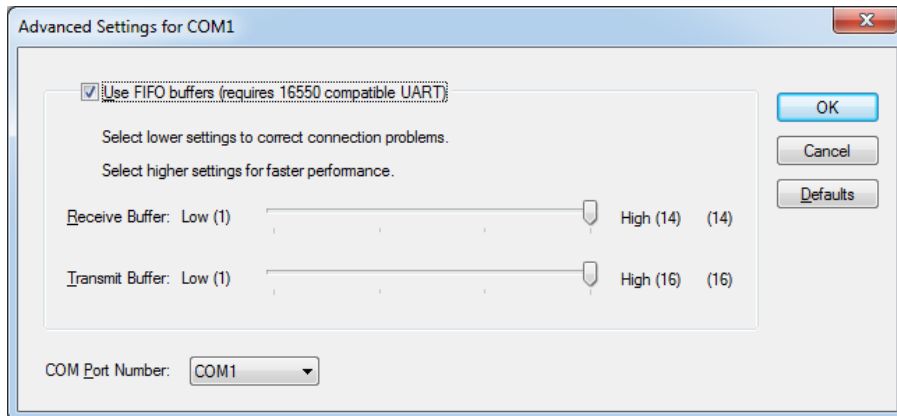
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - **Control Panel → System and Security → Select System → Device Manager**
  - **Start → Input Device Manager to Windows Search**
- 2 Select **Ports (COM & LPT)** and click **Communications Port** menu with the right mouse button. Then click **Properties**.



- 3 Click **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Click **OK** button after appointing **COM Port Number** to be used.

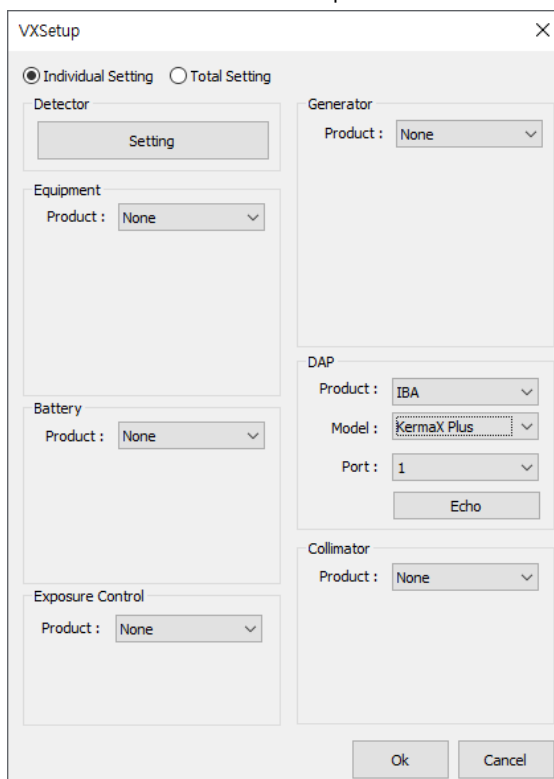


- Input or choose the configured COM port number when setting DAP in VXSetup.

## 6.5.2 How to Set KermaX in VXvue and VXSetup

### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
- 2 Choose **IBA** from the **Product** options in **DAP**



- 3 Choose COM port number among the sub options (1~25) of **Port**.
  - Refer to <6.5.1 How to Set Port from PC>

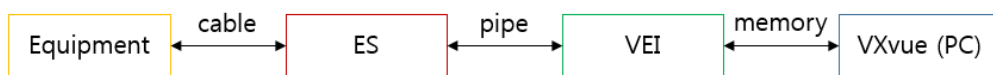
## 7. Equipment

Equipment refers to system equipment that combines medical equipment such as generators, collimators, DAP, and detectors. You can link VXvue with the equipment, adjust the position of the bucky, or perform auto-stitch.

### 7.1 Common Settings for Equipment

#### 7.1.1 Equipment Interlock Setting

Integration method – VEI



- It uses the interface (VEI) included in VXvue to communicate with the equipment control program (ES). ES communicates directly with the equipment.
  - Ex) Integration of SU4000
- VEI stands for 'Viewworks Equipment Interface' and is a communication protocol of Viewworks.
  - For more information about the protocol and VEI protocols, please contact a Viewworks representative.
- ES stands for 'Equipment Service' and is a middleware between VEI and battery (UPS).
  - Commands and data necessary for integrating between ES and equipment comply with the protocol specifications of battery.
  - Commands and data required for integrating between ES and VEI comply with the protocol specifications of VEI.

#### 7.1.2 How to Use Equipment in VXvue

You can preset the Auto Stitch or the defined location when interlocking VXvue with U-ARM, Rail and Stand.



- Setting – Equipment menu does not appear when interlocking to VSI. For more information, please contact to Viewworks.

#### U-Arm APR

You can edit APR(Pre-Defined Position) values in the predetermined location of U-ARM.

APR

Position	Stand Pos	Arm Angle	Det Pos	Det Angle	Tube Pos
STAND100	1445	90	610	0	390
STAND180	1445	90	860	0	940
TABLE	1115	0	610	0	390
DECUBITUS	1050	90	860	0	390

## Rail APR

You can edit APR (Pre-Defined Position) Code and description in the predetermined location of Rail.

APR Code / Description

APR Code	Description
P001	Shoulder upright
P002	Skull and cervical spine sitting
P003	Downward 15 degree
P004	Thorax 180
P005	Upwards 30 degree
P006	Table position
P007	Lumbar spine upright
P008	Elbow 115
P009	Foot ap
P010	Pelvis upright
P011	Knee patella
P012	Foot upright
P013	Upwards 15 degree

Code :  Description :

Selected Items :

## Auto Stitching Option

You can set whether to use this function or not when Auto-Stitching function is supported .Stitching Type varies depending on equipment.

Auto Stitching Option

☐ Use Auto-Stitching

Fixed OID value  mm (10 ~ 200)

Default Nested Distance  mm (10 ~ 200)

Set auto stitching distance  mm (100 ~ 430)

Menu	Description
Use Auto-Stitching	<ul style="list-style-type: none"> <li>Turns on/off the Auto Stitching option.</li> <li>All Auto-Stitching is operated only when taking an image with Stitch Protocol.</li> <li>Pattern Stitching: Each image is patter matched and stitched.</li> </ul>

	<ul style="list-style-type: none"> <li>Downward Stitching: Source(Tube) and Detector take an image by moving downward.</li> <li>Angular Stitching : Detector takes an image by moving vertically while Source(Tube) Source(Tube) spins in the fixed position.</li> </ul>
<b>Fixed OID Value</b>	<ul style="list-style-type: none"> <li>Enters the fixed distance value between detector sensor and detector surface.</li> </ul>
<b>Default Nested Distance</b>	<ul style="list-style-type: none"> <li>Sets the overlapping size of the images when going through Stitch exposure.</li> </ul>
<b>Set auto stitching distance</b>	<ul style="list-style-type: none"> <li>Sets travel range of the detector.</li> </ul>



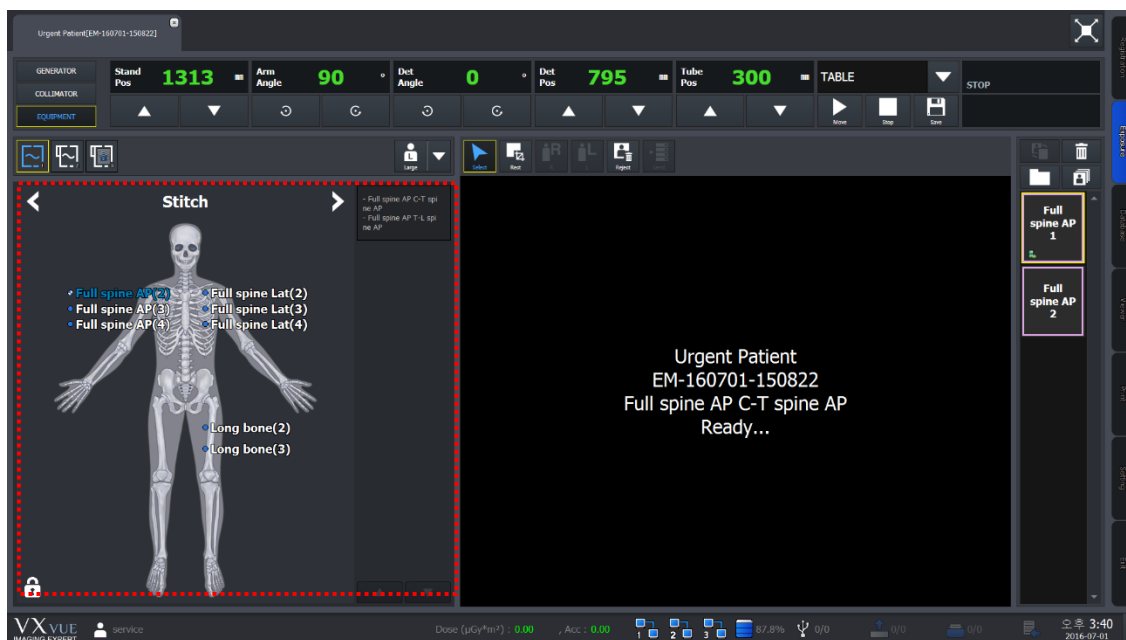
- You can check **Stitching Option** by going to **VXvue > Setting Tab > System > Integration** menu.



- Make sure to configure values of **Auto Stitching Option** every time you use the image stitching function for exact distance measurement.
- To get an exact distance value, not only OID but also Pixel Spacing in the detector should be operated. For more information please refer to **Detector** menu from **VXvue Service Manual**.

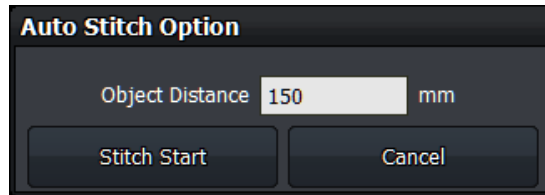
## How to Use Auto Stitch Mode

When you take Auto-Stitching images, you can shoot X-rays repeatedly while pressing the Exposure switch button, depending on the number of acquired stitching images. The U-Arm moves to the position of next shooting automatically whenever each image is taken.



4 Register the stitch protocol and start shooting X-ray.

- 5 **Auto Stitch Option** window appears when selecting the first Step. Input the object distance to a pop-up window of Auto Stitch Option, and click the Stitch Start button.



- Object Distance: It is the distance from Detector cover surface to the object. The result in which Fixed OID value and Object Distance value are added are applied when using Physical Matching.



- You can calculate and apply the actual distance with Stitch function.
- When canceling Auto Stitch, U-ARM cannot be automatically moved to the next location, while exposure and Stitch processing are available.

- 6 Input the object distance to a pop-up window of Auto Stitch Option, and click the Stitch Start button.

- 7 While images are being transmitted, U-ARM is automatically moved to the configured position to take the first image.

- 8 Once the U-Arm movement is completed, click the Exposure switch from Exposure Control.



- Once the U-Arm movement is completed, a **STITCH STOP** message pops up.
- If U-arm takes an image while being in motion, **Auto-Stitching** mode may not be operated and may occur an error.

- 9 Press the Exposure button on the hand switch (full press) and take images. Do not release the button until images of all steps in the stitch protocol are taken completely.

- U-Arm is moved to the next shooting position automatically when images of the first step are taken completely.
- The X-ray is shot automatically, and the U-ARM is moved to the next shooting position again. This process is repeated until taking the last step of stitch protocol. Release the Exposure button when the last step is shot completely.

- 10 It automatically moves to Stitch mode screen once all the Steps registered to Stitch Protocol are photographed.

- 11 The physical matched result is produced.

- 12 If necessary, you can fine-tune with Tool provided by Stitch mode.



- For more information on Stitch mode, please refer to **VXvue Operation Manual**.

## 7.2 SYFM U-ARM

This section explains about the integration process of **VXvue** and U-Arm of SYFE Co., Ltd.

### Interlock Condition

VEI and ES are used, and communication between ES and U-ARM must comply with RS-232 communication standard.

### Integrated Model

- SU3000 series
  - SU3000
- SU4000 series
  - SU4000
  - Compatible VXvue version, SU4000 F/W, SDK version

Mapped VXvue version	SU4000 Firmware (F / W) version	SU4000 SDK version
V1.0.0.86b22p5	V17	V1.4

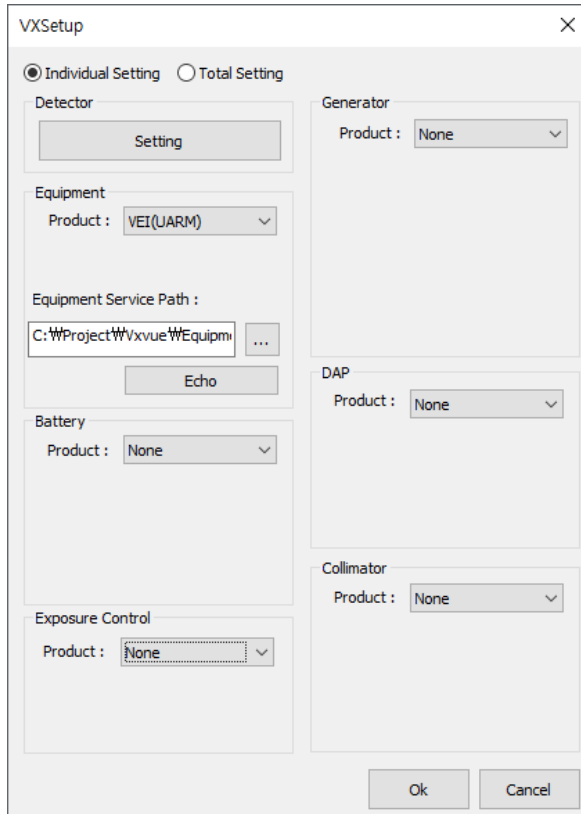



- The U-ARM is integrated to **VXvue for Human** only.

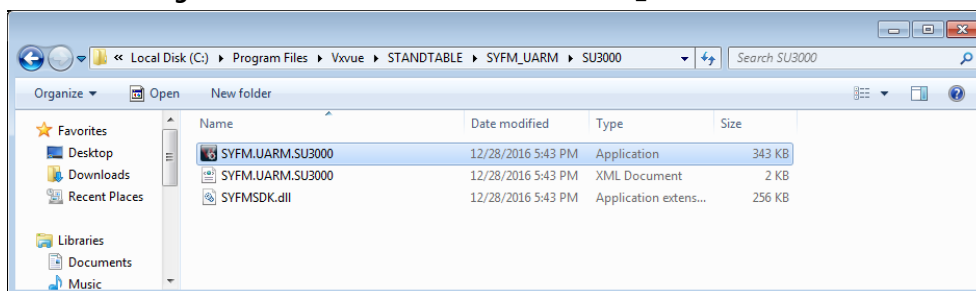
## 7.2.1 How to Set SYFM U-ARM in VXSetup and VXvue

### VXSetup

- 1 Run **VXSetup** and click the **Individual Setting** button.
  - Choose **VEI** among the options of **Product** in the **Stand** menu to assign path of Equipment Service.
- 2 Choose **VEI (UARM)** from Product.

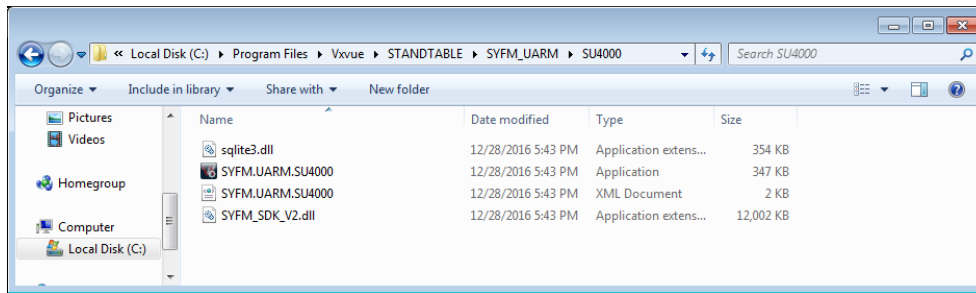


- 3 Click  button to specify the path by each generator model.
  - SU3000: **C:\Program Files\Vxvue\STANDTABLE\SYFM\_UARM\SU3000\SYFM.UARM.SU3000.exe**



- For SU3000, click 'Details' from the properties of SYFM SDK.dll in the path above to check the file version (V1.1.0.19).
- For SU3000, check calibration of each motor and setting value of supported functions from the edit mode of SYFM.UARM.SU3000.xml file.

□ SU4000: C:\Program Files\WVXvue\STANDTABLE\STFM\_UARM\SU4000\SYFM.UARM.SU4000.exe



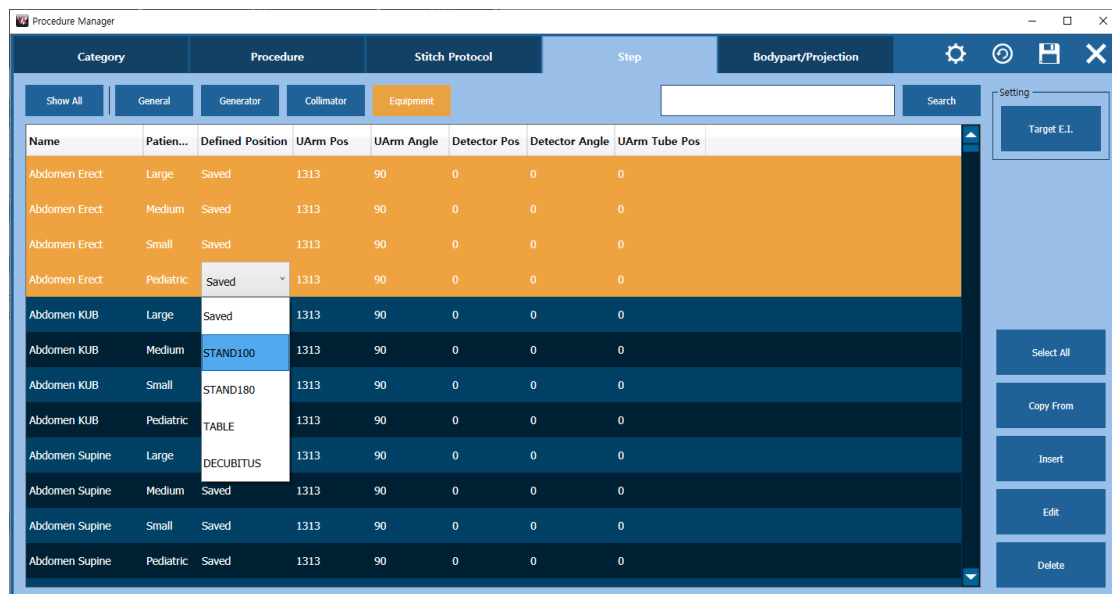
- For SU3000, click 'Details' from the properties of SYFMDK.dll in the path above to check the file version (V1.1.0.19).
- For SU3000, check calibration of each motor and setting value of supported functions from the edit mode of SYFM.UARM.SU3000.xml file.

4 Click Echo button to check the connecting status.

5 Click OK button to save the settings.

## 7.2.2 How to Set U-ARM in Procedure Manager in VXvue

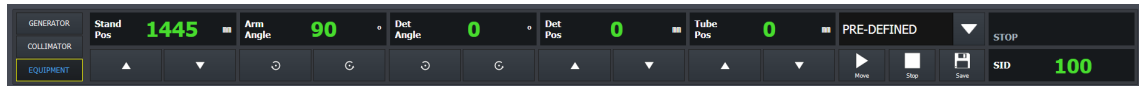
- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose the **Defined Position** column of items to be edited from the **Step** tab. Click the column and choose the item of **Pre-Defined APR**, which will be input automatically when you select a step from the **Exposure** mode.



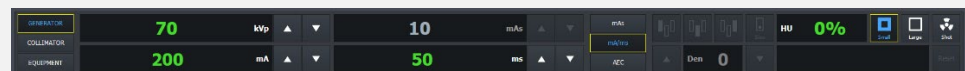
- If 'Equipment' is selected among the buttons at the top of the Step tab, only the equipment-related settings are displayed.
- For changing the detailed value of Defined Position, refer to <7.1.4Auto Position>.

### 7.2.3 How to Use SYFM U-ARM in VXvue

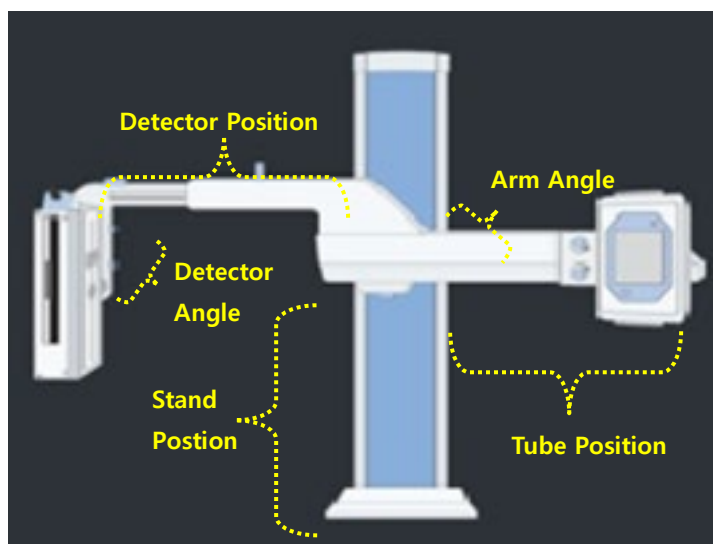
When all settings of **VXSetup** are completed, run **VXvue** and go to the **Exposure** mode. Then you can check the following UIs.




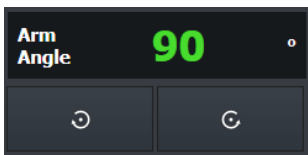




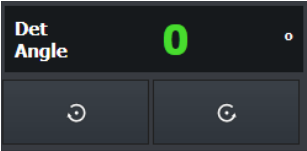


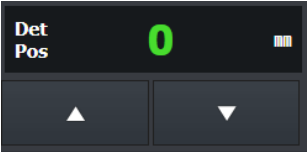


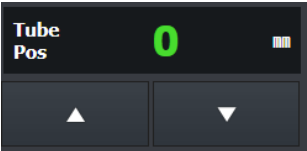


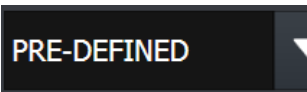
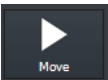
- If the U-ARM is connected with the generator at the same time, the control UI of generator is showed first. Click **Equipment** button at the left to move to the control UI of U-ARM.

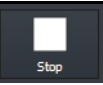







#### UI and Icons



Icon	Name	Description
	Stand Position	<p>Shows height of the arm from the stand. (Refer to the image above)</p> <ul style="list-style-type: none"> <li>• The height of arm is from the bottom where the U-ARM is installed to the center of Stand crossed with the arm. (Unit: mm)</li> <li>• The position can be adjusted with   buttons.</li> <li>• The minimum value within movable range is 0, and the maximum value is set depending on the result of U-Arm calibration.</li> </ul>
	Arm Angle	<p>Shows angle between the arm and the stand (Refer to the image above).</p> <ul style="list-style-type: none"> <li>• The angle is 0° when the arm and stand are aligned horizontally. The angle is 90° when the arm is perpendicular to the stand.</li> </ul>

		<ul style="list-style-type: none"> <li>The angle can be adjusted with   buttons.</li> <li>Both maximum and minimum angles are depending on the calibration result of U-RAM.</li> </ul>
	<p><b>Detector Angle</b></p>	<p>Shows angle between the arm and the detector. (Refer to the image above.)</p> <ul style="list-style-type: none"> <li>The angle is 0° when the arm is perpendicular to the detector, or the detector and stand are aligned horizontally.</li> <li>The angle can be adjusted with   buttons.</li> <li>Both maximum and minimum angles are depending on the calibration result of U-ARM.</li> </ul>
	<p><b>Detector Position</b></p>	<p>Shows position of the detector from the arm. (Refer to the image above.)</p> <ul style="list-style-type: none"> <li>Add current location of a tube and 1000mm to the location of a detector for calculating SID. (Unit: mm)</li> <li>The closer the detector is to the center of the STAND, the smaller the value. The farther it is, the higher the position value.</li> <li>The position can be adjusted with   buttons.</li> <li>Both maximum and minimum values are depending on the calibration result of U-ARM.</li> </ul>
	<p><b>Tube Position</b></p>	<p>Shows height of the generator tube from the arm. (Refer to the image above.)</p> <ul style="list-style-type: none"> <li>Add current location of a tube and 1000mm to the location of a detector for calculating SID. (Unit: mm)</li> <li>The closer the tube is to the center of the STAND, the smaller the value. The farther it is, the higher the position value.</li> <li>The position can be adjusted with   buttons.</li> <li>Both maximum and minimum values are depending on the calibration result of U-ARM.</li> </ul>
	<p><b>Pre-Defined APR</b></p>	<p>Sets the position of U-ARM with the APR pre-defined from the software.</p> <ul style="list-style-type: none"> <li>STAND 100, STAND 180, TABLE, DECUBITUS</li> </ul>
	<p><b>Move</b></p>	<p>Chooses <b>Pre-Defined APR</b> or a new step, and click <b>Move</b> button to make move each part of U-ARM as you set.</p>

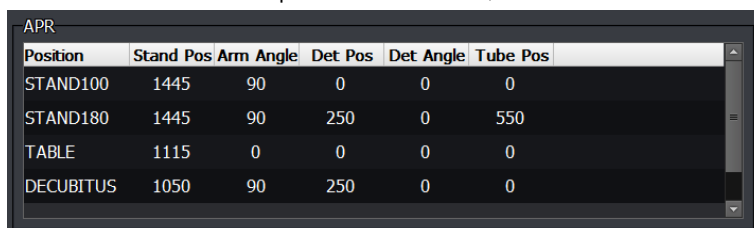
	<b>Stop</b>	Stops the current operation of U-ARM.
	<b>Save</b>	Saves the configured position of equipment to the step in use as APR.
	<b>Status Message</b>	Shows the operating status of U-ARM. <ul style="list-style-type: none"> <li>• STOP/RUN</li> <li>• APR STOP/APR RUN</li> <li>• STITCH MOVE/ STITCH STOP</li> <li>• ERROR</li> </ul>
	<b>SID</b>	Shows the current SID. <ul style="list-style-type: none"> <li>• Add current location of a tube and a detector to 1000mm (100cm) for calculating SID.</li> <li>• If an error occurs in U-ARM, SDI is invisible, but the error code and message display.</li> </ul>
	<b>Error Message</b>	Shows the current error <ul style="list-style-type: none"> <li>• When the error in U-ARM is cleared, the error code and message are invisible, but SID displays.</li> </ul>
	• Refer to <b>VXvue Operation Manual</b> for the detailed information about using <b>VXvue</b> .	

## 7.2.4 Auto Position

When taking images, each part of U-ARM can be saved as Step information in advance, and if you select Step, you can move U-ARM to that location.

### Specifying position of U-ARM to the step information

- 1 Move to the **Setting** mode → **Integration** → **Stand / Table** panel to save auto position.
  - If U-ARM is set in VXSetup and is connected, the Stand / Table items indicates in the Integration list.



Position	Stand Pos	Arm Angle	Det Pos	Det Angle	Tube Pos
STAND100	1445	90	0	0	0
STAND180	1445	90	250	0	550
TABLE	1115	0	0	0	0
DECUBITUS	1050	90	250	0	0

- 2 In the APR Defined Position menu (STAND 100 / STAND 180 / TABLE / DECUBITUS), double-click one of the items (Stand Pos, Arm Angle, Det Pos, Det Angle, Tube Pos) you want to modify it to the desired value.

The built-in values of **APR Defined Position** are as follows:

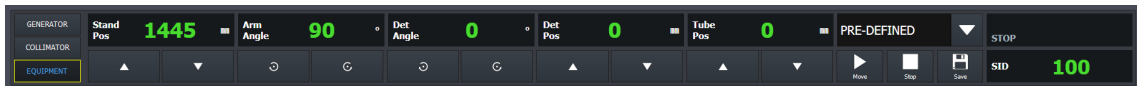
Defined Position	Arm Pos. (mm)	Arm Angle(°)	Det Pos(mm)	Det Angle(°)	Tube Pos(mm)
STAND 100	1445	90	0	0	0
STAND 180	1445	90	250	0	550
TABLE	1115	0	0	0	0
DECUBITUS	1050	90	250	0	0



- Click the **Update** button after you change the value of **APR Defined Position**.

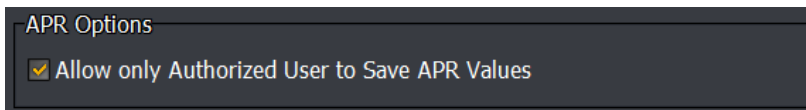
### Saving auto position from U-ARM UI in the Exposure mode

- Click the **Save** button to save the current position of U-ARM to the selected step.



### Setting APR (Anatomic Programming Radiography) Option

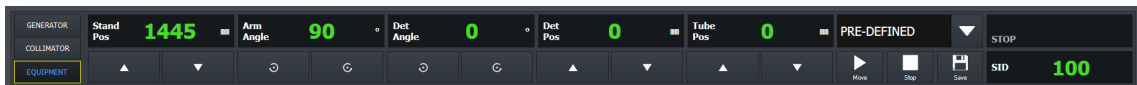
If the following option is selected in Setting > Integration > General, only users with Service or Admin privileges can save the generator's investigation conditions in Steps.





### How to move to U-ARM Auto Position of Step

1 Set integration of U-ARM in **VXsetup** and connect the U-ARM physically.

- Register a study and then the position information stored as steps displays.



2 Click  button to make each part of U-ARM move to the specified position. Click  button to stop moving U-ARM.

### 7.2.5 Integrating Exposure Control Module

When you take Auto-Stitching images, the shooting signal is transmitted to U-Arm while you press the exposure switch of the Exposure Control module.



- The integration of exposure control module is available to VXvue for Human with the U-ARM only.
- The exposure control module of **SYFM SU4000** series is attached to the U-Arm. Contact to SYFM, the manufacturer of U-Arm for the way of integration and settings between the exposure control module and generator.

#### Interlock Condition

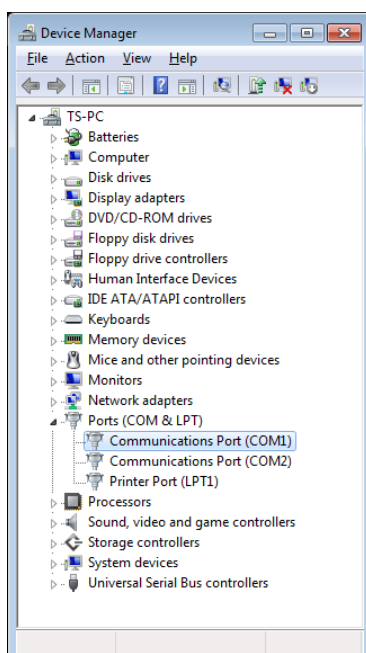
- Integration of the U-ARM (**SYFM SU3000** series).
- Integration of the generator (CPI generator only)
- Connecting the extra exposure control module (provided by SYFM).
- Registering the stitch protocol when shooting images in VXvue.
- Complying with the communication standard of RS-232.



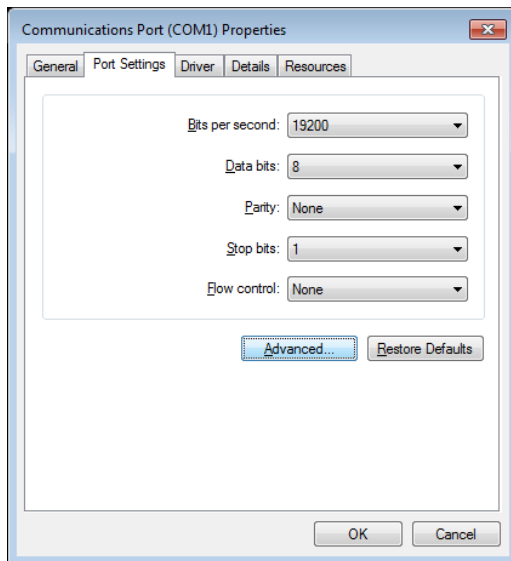
- The generator cannot be connected normally depending on its type. The CPI generator is known to be connected with **VXvue** normally.

#### How to Set Port from PC

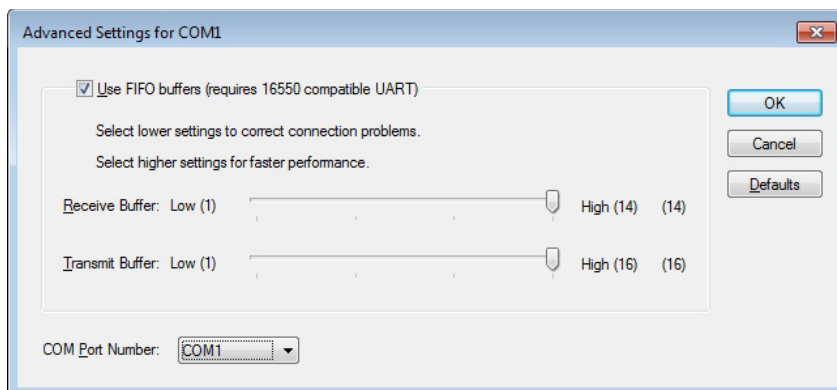
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and then the **Communications Port** menu. Check the comport number connected with U-Arm.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.



- 4 Select the number from **COM Port Number** and click **OK** button to change the port number.



- Select or input the configured COM port number when setting **Exposure Control** in VXSetup.

## Setting in VXSetup

- 1 Choose **Individual Setting**.

- **Product:** Choose **SYFM**
- **Model:** Choose **AutoExposure**

- 2 Choose the COM Port number configured from the PC.  
(Refer to 'How to Set Port' from PC in <7.3.2 How to Set Port from PC>.)

VXSetup

☒ Individual Setting ☐ Total Setting

Detector  
Setting

Equipment  
Product : None

Battery  
Product : None

Exposure Control  
Product : SYFM  
Model : AutoExposure  
Port : 1

Generator  
Product : None

DAP  
Product : None

Collimator  
Product : None

Ok Cancel

## 7.3 Roesys X-twin

This chapter describes how to integrate VXvue with X-twin, a rail from Roesys.

### Interlock Condition

VEI and ES are used, and communication between ES and X-twin (Rail) must comply with RS-232 communication standard.

### Integrated Model

- X-twin series

Mapped VXvue version	Firmware (F/W) version	Room Monitor S/W version
V1.0.1.3	V1.86.0.0	V1.0.75



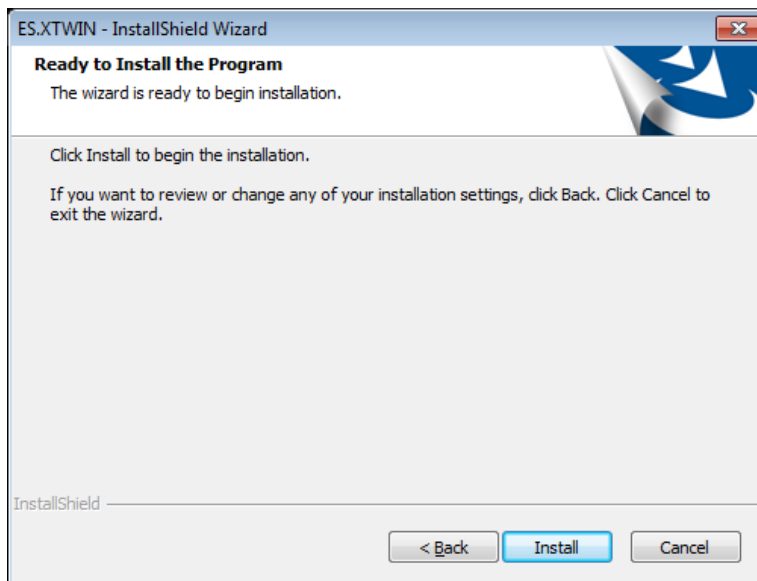
- The X-twin can be integrated to **VXvue for Human** only.

### 7.3.1 How to Install ES

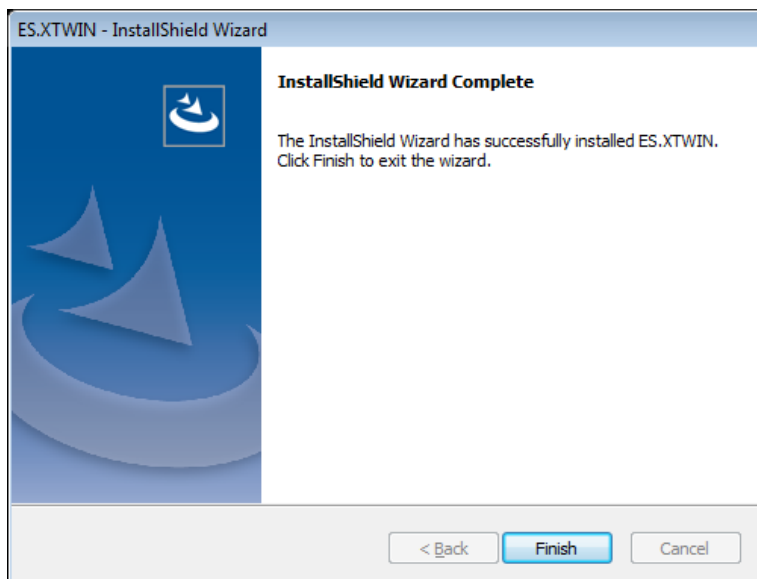


- To use X-twin, you must install **ES.XTWIN.Setup.exe** separately. If you need the installation file, please contact a person in charge in Viewworks.

- 1 Install VXvue first.
- 2 Run the ES.XTWIN.Setup.exe file in administrator mode.
- 3 Click the Install button.



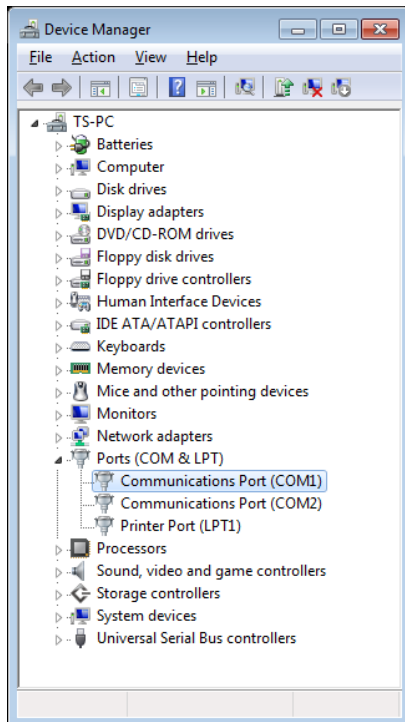
- 4 When the installation is complete, click the Finish button.



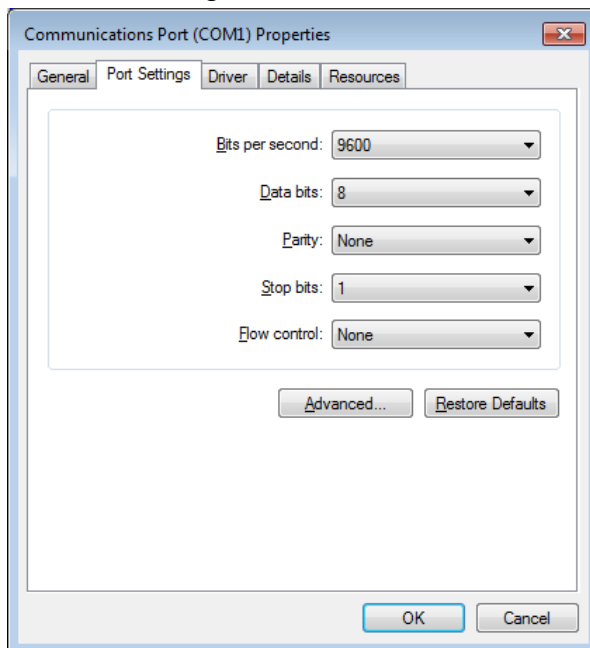
- 5 After the installation is complete, check that the ES.XTWIN folder and sub files are installed normally in the following path.
  - C:\Program files\VXvue\Equipment\ES.XTWIN\

### 7.3.2 How to Set Port from PC

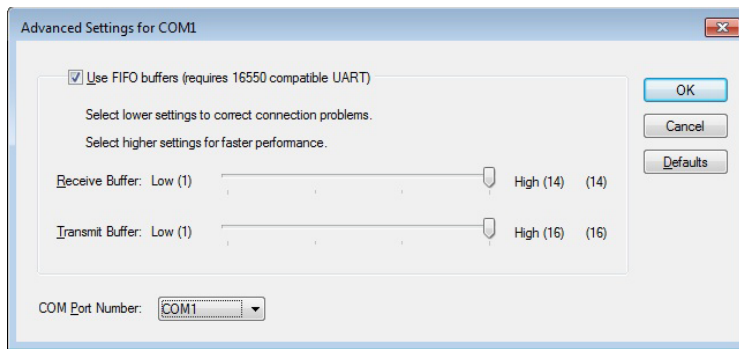
- 1 Run **Device Manager** by selecting one of the two steps as follows:
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and then the **Communications Port** menu. Check the comport number connected with U-Arm.



- 3 Click the **Port Settings** tab and set each menu as follows. Then click the **Advanced** tab.




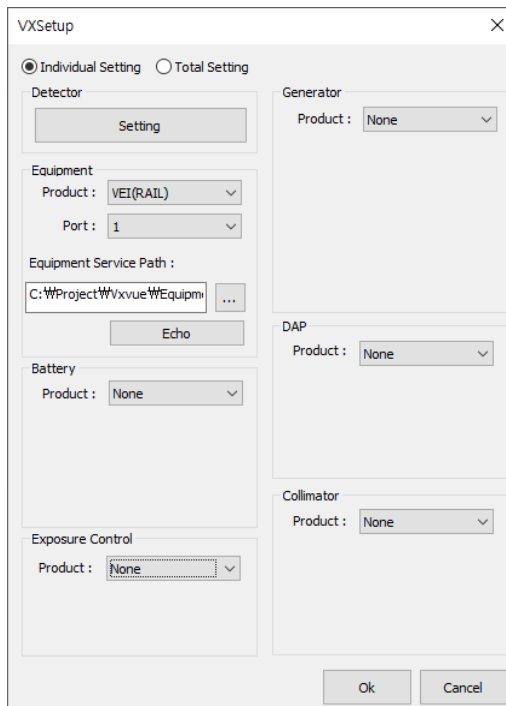
- 4 Select the number from **COM Port Number** and click **OK** button to change the port number.



- Select or input the configured COM port number when setting **Generator** related function in VXSetup.

### 7.3.3 How to Set X-twin (Rail) in VXSetup

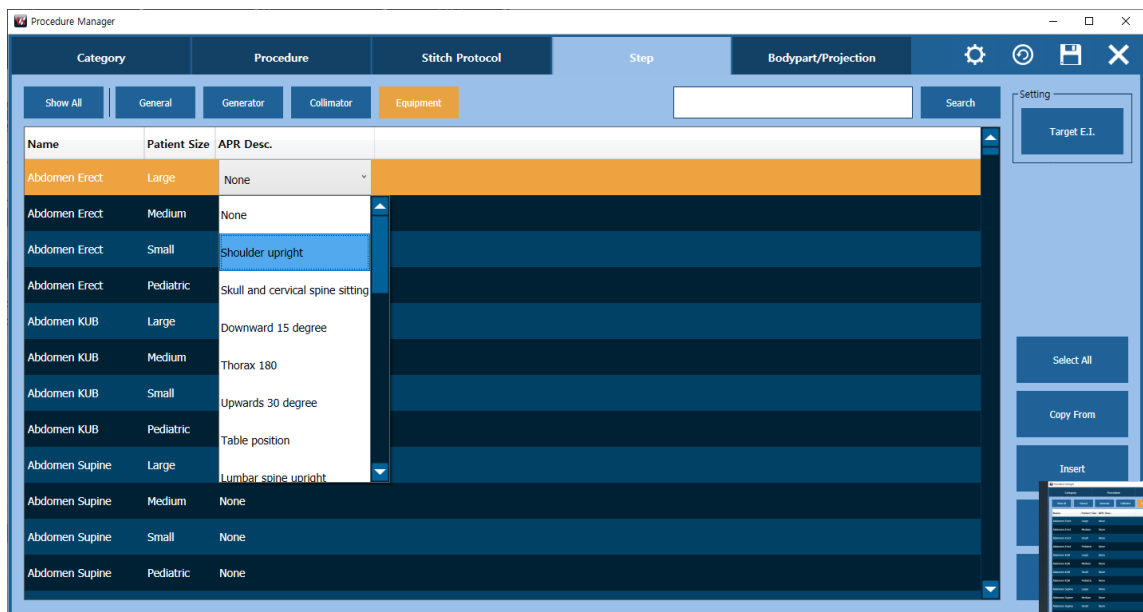
- 1 Run **VXSetup** and click the **Individual** button.
- 2 Set each item of the **Equipment** menu as follows.
  - Product: VEI(RAIL)
  - Port: COM port number configured from PC. (Refer to <7.3.2 How to Set Port from PC>)
- 3 Click  button and enter the path of ES.XWIN.exe (Equipment Service) prepared in <7.3.1 How to Install ES>.
  - Ex) C:\Program files\WVXvue\Equipment\ES.XTWIN\ES.XTWIN.exe



- 4 Click Echo button to check the connecting status.
- 5 Click OK button to save the settings.

### 7.3.4 How to Set X-twin(Rail) in Procedure Manager of VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**.
  - Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose the **APR Desc** column of items to be edited from the **Step** tab. Click the column and choose the item of **Pre-Defined APR**, which will be input automatically when you select a step from the **Exposure** mode.



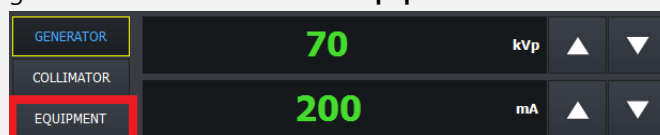
- If 'Equipment' is selected among the buttons at the top of the Step tab, only the equipment-related settings are displayed.
- For changing the detailed settings of APR Desc, refer to <7.3.6 How to Set APR>.

### 7.3.5 How to Use X-twin(Rail) in VXvue

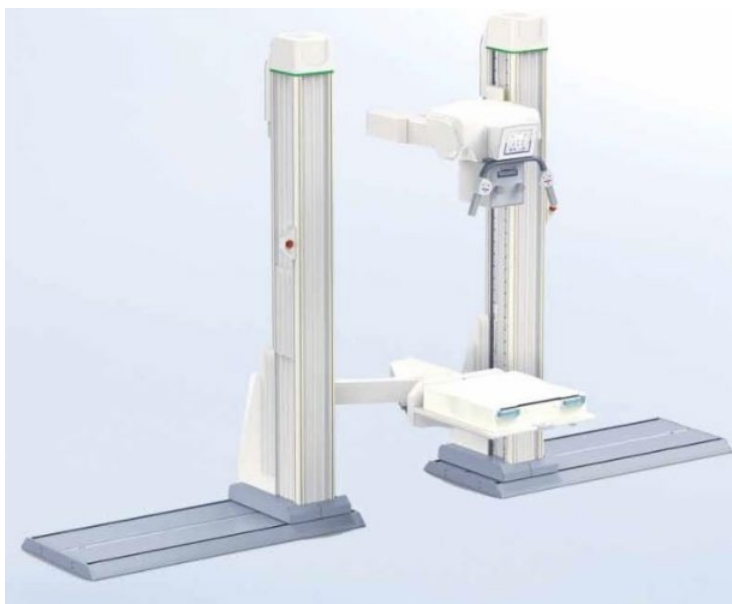
When all settings are completed, run **VXvue** and go to the **Exposure** mode. Then you can check the following UIs.



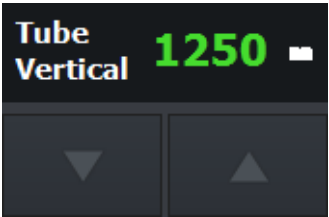

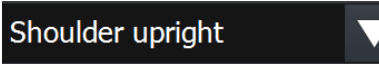


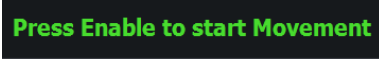

- If the U-ARM is connected with the generator at the same time, the control UI of generator is showed first. Click **Equipment** button at the left to move to the related UI.



## UI and Icons



Icon	Name	Description
	Detector Horizon	<p>Refer to the left stand of the image above.</p> <ul style="list-style-type: none"> <li>Distance from the center to the bucket equipped with detector (mm).</li> <li>Converging to zero (0) as the equipment moves to the center.</li> </ul>
	Detector Vertical	<p>Refer to the left stand of the image above.</p> <ul style="list-style-type: none"> <li>Distance from the bottom to the bucket equipped with detector (mm).</li> <li>Converging to zero (0) as the equipment moves down.</li> </ul>
	Detector Rotate	<p>Refer to the left stand of the image above.</p> <ul style="list-style-type: none"> <li>Rotation angle of the equipped detector.</li> <li>Converging to zero (0) as the equipment rotates horizontally.</li> </ul>
	Tube Horizon	<p>Refer to the right stand of the image above.</p> <ul style="list-style-type: none"> <li>Distance from center to tube-mounted bucky (mm)</li> <li>Converging to zero (0) as the equipment moves to the center.</li> </ul>

	Tube Vertical	<p>Refer to the right stand of the image above.</p> <ul style="list-style-type: none"> <li>Distance from the button to tube-mounted bucky (mm)</li> <li>Converging to zero (0) as the equipment moves down.</li> </ul>
	Tube Rotate	<p>Refer to the right stand of the image above.</p> <ul style="list-style-type: none"> <li>Rotation angle of the equipped tube.</li> <li>Converging to zero (0) as the equipment rotates horizontally.</li> </ul>
	APR	<p>Selects the pre-defined APR item to set to move the X-twin equipment automatically.</p>
	Status Message	<p>Indicates the operation status.</p> <ul style="list-style-type: none"> <li>Stitch Ready / Not Ready</li> <li>(X-ray) Ready / Not Ready</li> <li>Executing Movement</li> <li>Emergency Stop</li> <li>Error</li> </ul>
	SID	<p>Refer to the screen image.</p> <ul style="list-style-type: none"> <li>Current SID value received from the equipment</li> </ul>
	Detailed Message	<p>Indicates a detailed message.</p> <ul style="list-style-type: none"> <li>(Equipment) Disconnected</li> <li>Check Message on Room Monitor (Error)</li> <li>Executing Movement</li> <li>Shot after Setting Position (for Stitch)</li> <li>Press Enable to start Movement</li> </ul>
	<ul style="list-style-type: none"> <li>Refer to <b>VXvue Operation Manual</b> for the detailed information about using <b>VXvue</b>.</li> </ul>	

### 7.3.6 How to Set APR

Set the preset APR Code and details configured in the equipment in advance, and select Step to automatically move the equipment to the location.



- Contact the manufacturer, Roesys, for APR information set on the equipment.

APR Code / Description	
APR Code	Description
P001	Shoulder upright
P002	Skull and cervical spine sitting
P003	Downward 15 degree
P004	Thorax 180
P005	Upwards 30 degree
P006	Table position
P007	Lumbar spine upright
P008	Elbow 115
P009	Foot ap
P010	Pelvis upright
P011	Knee patella
P012	Foot upright
P013	Upwards 15 degree

Code :  Description :  + Add

Selected Items :  - Delete

### Adding APR information

- **Setting** mode → **Integration** → **Rail** panel
  - Enter **APR Code** and **APR Description** and click the Add button to add APR information.
  - APR Code and APR Description cannot be duplicated.

Code :  Description :  + Add

### Editing APR information

- **Setting** mode → **Integration** → **Rail** panel
  - Click the **APR Code / APR Description** and click on another part to edit the APR information.
  - APR Code and APR Description cannot be duplicated.

P003

### Deleting APR information

- **Setting** mode → **Integration** → **Rail** panel
  - Select **APR Code / APR Description** and click Delete button to delete APR information.

Selected Items :  - Delete

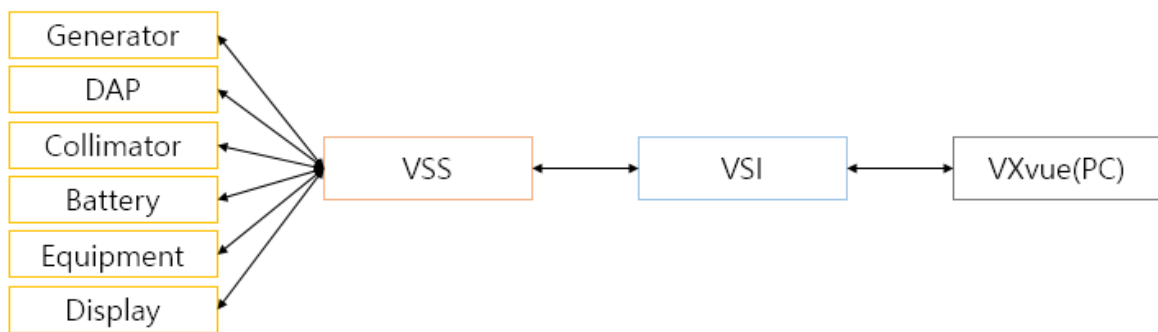
## 8. System

System is a device that includes at least one of the following items - a generator, DAP, collimator, battery (UPS), equipment, and display device. Users can configure and link VXvue and various devices into one system and perform each device function using VSI (Viewworks System Interface).

### 8.1 Common Settings for System

#### 8.1.1 System Interlock Setting

##### VSI Integration



- VSI uses the interface (Viewworks System Interface - VSI) included in VXvue to communicate with the system integration program (Viewworks System Service - VSS). VSS communicates directly with multiple devices.
- VSI stands for 'Viewworks System Interface' and is a communication protocol of Viewworks.
  - For more information about the VSI protocols, please contact a person in charge of Viewworks.
- VSS stands for 'Viewworks System Service' and is middleware between VSI and system device.
  - Commands and data necessary for integrating between VSS and device comply with protocol specification of the linked device.
  - Commands and data required for integrating between VSS and VSI comply with the VSI protocol.

#### 8.1.2 How to Use System in VXvue



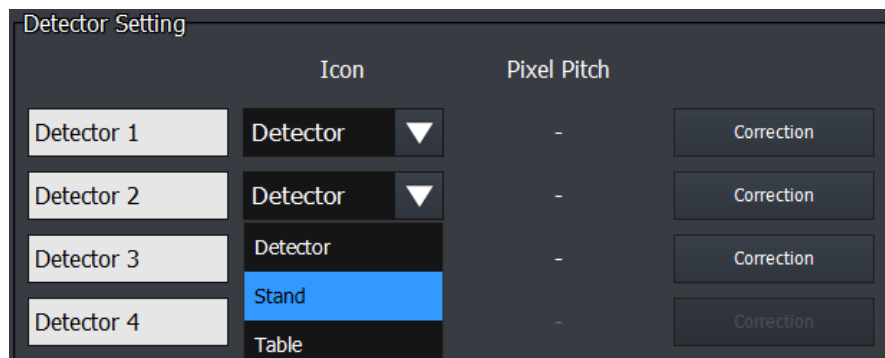
- System cannot be configured with use of individual module like GS, CS, and CS when interlocking to VSI. For more information, contact to Viewworks.

## Setting Receptor Icon

You can substitute **Receptor(Bucky)** icon for the **Detector icon** shown in the **Exposure tab** to install Detector.

## Setting method

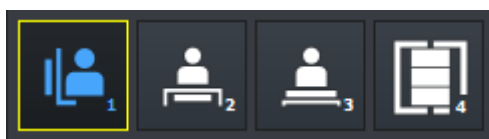
1 Go to **Setting** → **Integration** → **Detector** in VXvue and select the **Receptor(Bucky)** icon for Detector mapping.









- **Detector** icon setting is mapped in order of **1, 2, 3, 4 Detector** on the **VXvue - Exposure** screen.

2 Click the **Update** button at top left.


3 Check if the **Detector panel** icon is successfully changed from **Exposure Tab** in **VXvue**.




## Icon list configurable to Detector

Icon	Selected Option
 	Detector
	Stand
	Table
	Table Top
	No Bucky

### Saving and using the current dose condition in Step

When connecting VXvue and the generator using the software virtual console, click  (**Save Dose**) button from **VXvue – Exposure tab** to set the current dose condition (kVp, mA, ms, mAs, Focal Spot, AEC Density) as a default.

### Recalling and using the dose condition (used in the previous shooting)

When using the software virtual console to link VXvue and the generator, clicking  (**Reload**) button from **VXvue – Exposure tab** recalls the dose condition and system condition used during the previous shooting and can be set as the conditions for shooting in the generator.

### Mapping Receptor(Bucky) and Detector

When selecting **Detector/Receptor** for exposure from **Exposure tab** after mapping **Receptor** and **Detector**, the selected device and mapped equipment are automatically configurable.



- The **Detector** mapped to Receptor is automatically selected if you select **Receptor** from **Exposure tab** when mapping **Receptor**.
- The **Receptor** mapped to Detector is automatically selected if you select **Detector** from **Exposure tab** when mapping **Receptor**.

- You can map detectors by Bucky(Receptor) by going to Setting mode - Integration – Bucky panel.

Integration - Bucky					
Bucky	Alias	Show Receptor Name	Mapped Detector	Tube	
TABLE		Y			
STAND		N			
TABLE_TOP		N			
NO_BUCKY		N	No-Bucky		
CR		N	CR Mode		



- You can map one detector by one Bucky.
- You can map the same Receptor Name from multiple Buckies.
- You can configure Tube and AEC Chamber Mapping by each Bucky.
- You can configure a desired name of Bucky on Alias column.
- When mapping a detector on multiple Buckies, the very top one is automatically selected.



- CR Bucky is only mapped by CR Detector.



- To be displayed on VXvue – Exposure screen, make sure to set Show to Y.
- **Stand/Table/Table Top/No Bucky** icons are also added to **Detector** icon on **VXvue – Exposure** mode in the configured **Receptor**.
- If you select the **Receptor** icon, the configured Receptor and the **Detector** mapped to the Receptor are automatically set.

## 8.2 SG Healthcare Jumong Mobile

This section explains about the integration process between **VXvue** and **SG Healthcare Jumong Mobile** generator.

### Integration Model

Jumong Mobile

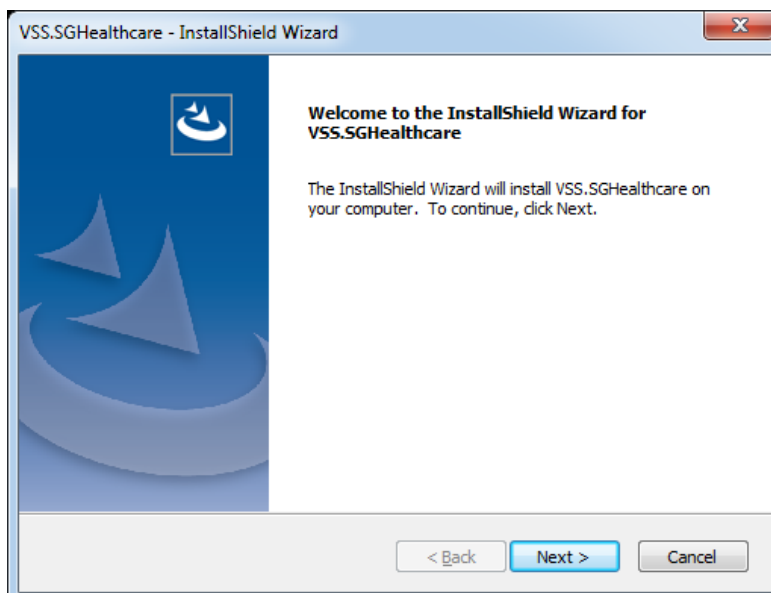
Mapped VXvue ver.	System Firmware ver.
V1.0.2.6	S00E17

### 8.2.1 Installing VSS

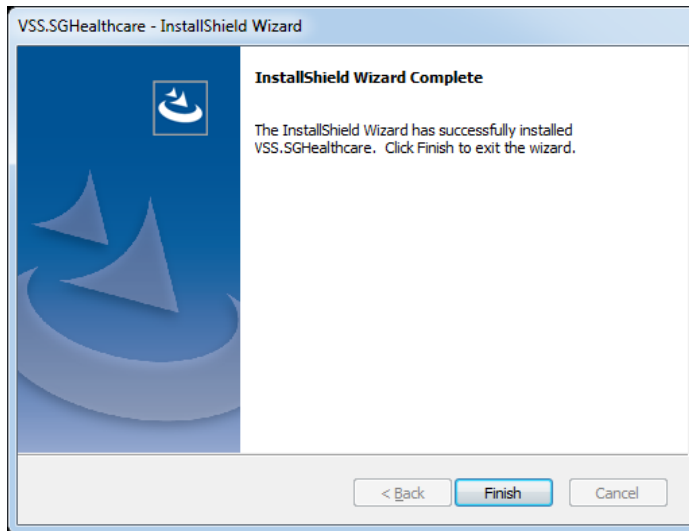


- You should install **VSS.SG.Healthcare.Setup.exe** separately to use SG Healthcare Jumong Mobile generator. Contact the person in charge of Vieworks if you need to install the file.

- 1 Install **VXvue**.
- 2 Execute **VSS.SG.Healthcare.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing the file.



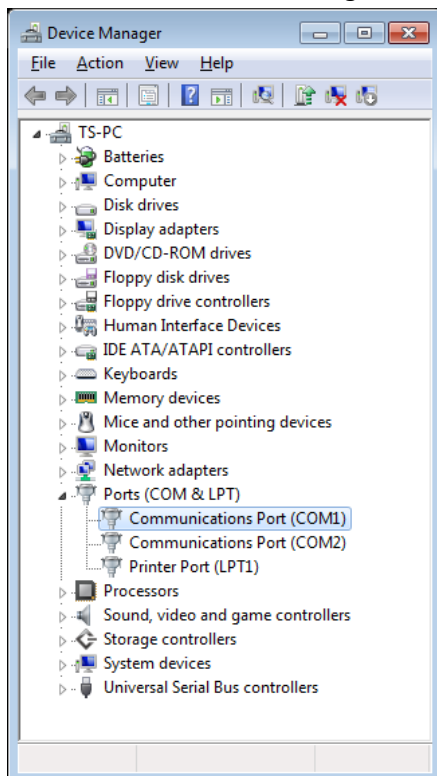
- 4 Click the **Finish** button to complete installation.



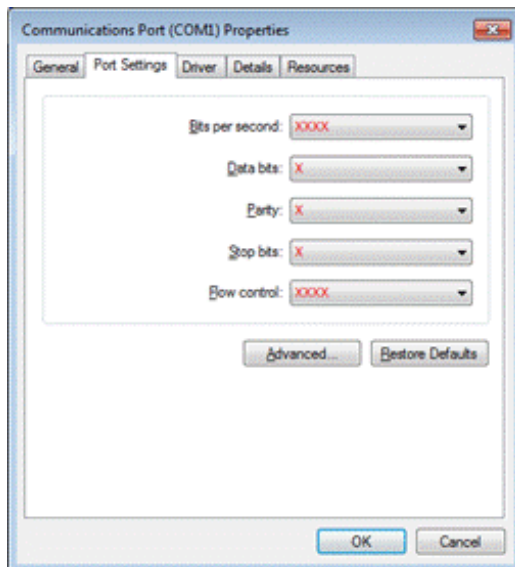
- 5 Check if '[Database of VXvue]\Integration\VSS.SGHealthcare' folder and the sub files are installed successfully.
  - Ex) D:\Database\Integration\VSS.SGHealthcare\

## 8.2.2 How to Set Port from PC

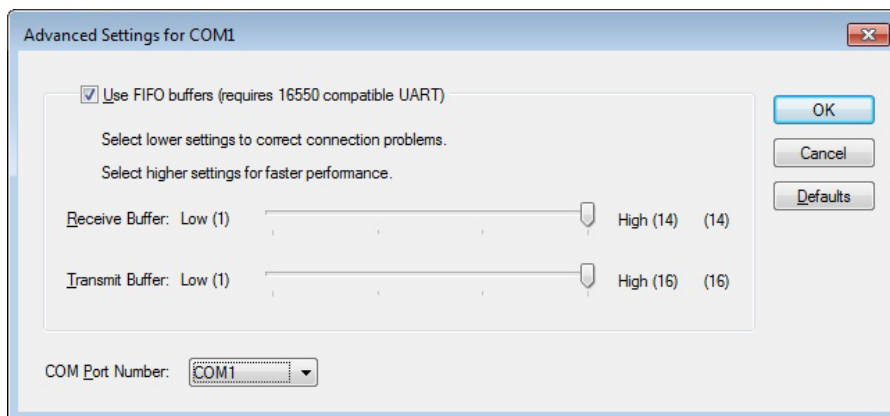
- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port** Settings tab and set each menu as follows. Then click the **Advanced** tab.
- Bit per second: **9600** / Data bits: **8** / Parity: **None** / Stop bits: **1** / Flow control: **None**



- 4 If you need to change the port number, specify the COM Port number and click the OK button.

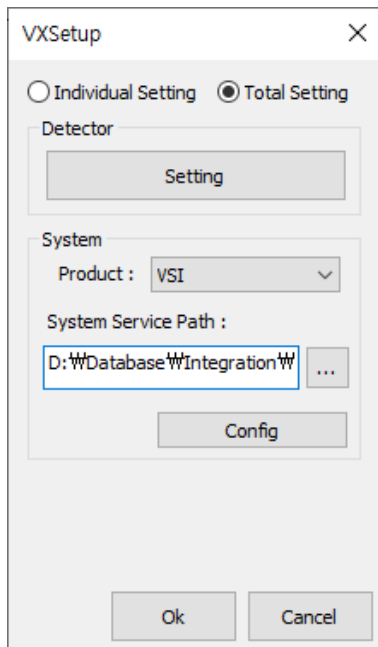


- Input or choose the configured COM port number when you set system in VXSetup.

### 8.2.3 How to Set VSS in VXSetup

#### VXSetup

- 1 Run **VXSetup** and click the **Total Setting** button.



- 2 Choose 'VSI' in the Product menu of **System**.
- 3 Set the System Service Path to [VXvue Database]\Integration\VSS.SGHealthcare\VSS.SG\_Healthcare.exe.  
▫ Ex) D:\Database\Integration\VSS.SGHealthcare\VSS.SG\_Healthcare.exe
- 4 Click the **Config** button to run the equipment setting mode of the system service.
- 5 When the system service equipment setting window is displayed, click the **Ok** button to finish.

## 8.2.4 Device Setting Mode of VXvue and VXSetup

### VXSetup

- 1 Click the **Config** button of VXSetup System to start the equipment setting mode.

The screenshot shows the ConfigurationTool window with the following sections:

- Environment:**
  - Generator Port: COM1 (dropdown), Echo (button)
  - Control Port: COM3 (dropdown), Echo (button)
  - Attachments: Battery (button)
- Dose Settings:**
  - kVp: Minimum 40, Maximum 150
  - mA: List of values from 10 to 71
  - ms: List of values from 1 to 7.1
  - mAs: List of values from 0.1 to 0.71
- Battery:**
  - Warning Level: 20
  - Critical Level: 10
  - Save (button), Close (button)

- 2 Set the Serial COM Port to be used for communicating with the device.

This close-up shows the Environment section with the following details:

- Generator Port: COM1 (dropdown), Echo (button)
- Control Port: COM3 (dropdown), Echo (button)

- Select the port connected to the generator in 'Generator Port'.
  - Select the port connected to the mobile device in 'Control Port'. (Control exposure, movement, etc.)
- 3 After selecting the COM Port to use, click the **Echo** button to check the communication status.
    - If connected normally, a 'Connection Success' message appears.
    - If connection fails, a 'Connection Failed' message appears.

- 4 If you need to set the dose parameter, modify the value of each item located at the bottom of **Dose Settings**.

**Dose Settings**

kVp

Minimum  Maximum

mA

10
11
12
14
16
18
20
22
25
28
32
36
40
45
50
56
63
71
80
90
100

ms

1
1.1
1.2
1.4
1.6
1.8
2
2.2
2.5
2.8
3.2
3.6
4
4.5
5
5.6
6.3
7.1
8
9
10

mAs

0.1
0.11
0.12
0.14
0.16
0.18
0.2
0.22
0.25
0.28
0.32
0.36
0.4
0.45
0.5
0.56
0.63
0.71
0.8
0.9
1

- 5 Edit the Warning / Critical Level to change the battery warning level.

**Battery**

Warning Level:  Critical Level:



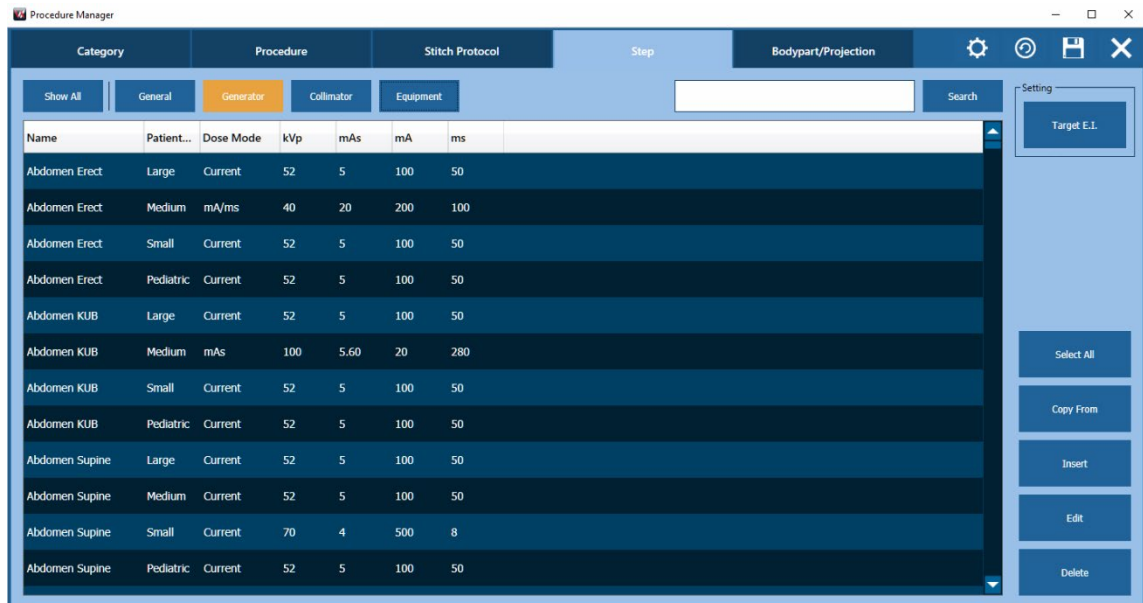
- Battery level ranges between 10 and 100.
- Warning Level should be higher than Critical Level.

- 6 When settings are complete, click the **Save** button to save the settings.

- 7 Click the Close button to exit the setting mode.

### 8.2.5 How to Set System in Procedure Manager of VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**. Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- Choose **Dose Mode / kVp / mAs / mA / ms** columns of items to be edited from the **Step** tab. Click the columns and choose the setting value related to the generator, which will be input automatically when you select a step from the **Exposure** mode of **VXvue**.



Name	Patient...	Dose Mode	kVp	mAs	mA	ms
Abdomen Erect	Large	Current	52	5	100	50
Abdomen Erect	Medium	mA/ms	40	20	200	100
Abdomen Erect	Small	Current	52	5	100	50
Abdomen Erect	Pediatric	Current	52	5	100	50
Abdomen KUB	Large	Current	52	5	100	50
Abdomen KUB	Medium	mAs	100	5.60	20	280
Abdomen KUB	Small	Current	52	5	100	50
Abdomen KUB	Pediatric	Current	52	5	100	50
Abdomen Supine	Large	Current	52	5	100	50
Abdomen Supine	Medium	Current	52	5	100	50
Abdomen Supine	Small	Current	70	4	500	8
Abdomen Supine	Pediatric	Current	52	5	100	50



- If only 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of a function which the generator is not supported.
- If you select a value other than Current in Dose mode, it automatically switches to the configured Dose mode when Step was selected.

### 8.2.6 How to Use Jumong Mobile System in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.








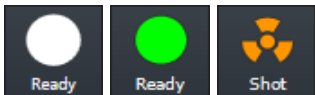
- Check the following status if generator control UI is not indicated.
  - Check if the power of system is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port setting, etc.)

- You can perform the following functions:
  - Adjusting kVp and mAs
  - Adjusting mA and ms instead of mAs

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100
3 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

## Icons

The disabled UIs are not the supported ones when the viewer is integrated with Jumong Mobile generator.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	When an error occurs that can be solved by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>Click this icon at this time to start reset.</li> </ul>
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>0&lt;HU≤50: Green</li> <li>50&lt;HU≤80: Yellow</li> <li>80&lt;HU: Red</li> </ul>
	X-ray Status	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>Ready (White) - Standby</li> <li>Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>

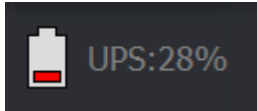
## Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning







### 8.2.7 Checking the Battery Level in VXvue

At the bottom right of the status bar, you can check the remaining amount of the battery (UPS) as follows;



The icon changes in VXvue according to the options.

- When 20% of the battery(default value, changeable) is left, a warning message indicating that the battery is low is displayed.
- If the battery is 10% remaining (default value, changeable), a warning message indicating that the battery level is low will be displayed, and both VXvue and the system will shut down after the set time.
- When charging, the warning message related to the remaining amount is not displayed, and the icon is changed to indicate charging status.

Icon	Battery Level
	Charging
	91~100%
	66~90%
	36~65%
	11~35%
	0~10%

## 8.2.8 Error and Warning Messages of Jumong Mobile



- If the error message still appears even after clicking the Reset button or rebooting the system, contact the manufacturer.

- Recoverable Error: The **Reset** button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.

### Error Messages

Code	Error Message
0001	Console Invalid Command
0002	Door Interlock
0003	Interlock
0004	Prep Timeout
0005	Ready Timeout
0006	Filament Timeout
0007	No Library Data
0008	No Calibration Data
0009	SW Configuration File Empty
0010	Calibration Manually Terminated
0011	Manually Terminate Exposure
0012	PREP Manually Terminate
0013	Seasoning Manually Terminated
0014	AC Voltage UVP
0015	Bucky ready open
0016	NO AEC APR data
0017	AEC mode timeout
0018	AEC calibration mAs out of specification
0019	AEC exposure time out
0020	Snap over power rating
1001	SW OTP
1002	Thermal Switch
1003	XRAY Over HU
1004	Aux Power Off
1005	DR reset fail
1006	DR ready fail
1007	Battery communication loss
1008	AEC & DAP Communication interrupt
1009	Fluoroscopic time out
1010	DAP device error

1011	Snap over time
2001	SW Vout OVP
2002	SW Vout UVP
2003	SW Anode OCP
2004	SW Anode UCP
2005	Input Voltage OVP
2006	Input Voltage UVP
2007	24VDC UVP
2008	HW Vout OVP
2009	Capacitive Protection
2010	Primary OCP
2011	HW Cathode OCP
2012	HW Anode OCP
2013	Charger OTP
2014	PFC BUS UVP
2015	Flow fault
2016	PFC start fail
3001	SW Thermal sense fault
3002	Fan 1 Fault
3003	Fan 2 Fault
3004	Filament Power Fault
3005	Soft Start Fail
3006	Ma Test Point Open
3007	Tank Connect
3008	Self Test Error
3009	Motor Short
3010	Motor invalid command
3011	Motor OCP1
3012	Motor OCP2
3013	Motor Communication Loss
3014	Motor Main Open
3015	Motor Shift Open
3016	Charger Fail
3017	Bus UVP
3018	Battery UVP
3019	Cart UVP
3020	Inverter error
3021	Discharge Relay Fail
3022	Battery OVP
3023	Battery OCP

3024	Battery OTP
3025	Battery Fail
3026	APS1 Fail
3027	APS2 Fail
3028	APS3 Fail
3029	Capacitor error
3030	Fan 3 Fault
3031	Fan 4 Fault
3032	PFC OTP and Brown out
4001	SW Current Unbalance
4002	SW Filament OCP
4003	Shoot Inv1
4004	Shoot Inv2
4005	HW Filament Rms
4006	Error Repeat 5 Times
9997	Response delaying...
9998	Response timeout expired
9999	Generator restarting

### Communication Error

Code	Error Message
0x0A	parameter ok
0x01	mode inhibited
0x02	out of tube rating
0x03	out of power
0x04	out of work
0x05	out of voltage range
0x06	out of current range
0x07	out of time range
0x08	out of mAs
0x09	time too small
0x0B	mAs too small
0x0C	no CMD
0x0D	data not complete (reserved)
0x0E	over tube HU
0x0F	out of filament current range
0x10	no library data
0x11	tube PN not match

0x12	focal spot not support
0x13	data break
0x14	EEPROM BUSY
0x15	exposure result empty
0x16	tube calibration data empty
0x17	XRAY interval time
0x18	Filament current limit
0x19	over generator HU
0x1A	over motor HU
0xA0	invalid CMD
0x15	exposure result empty
0x16	tube calibration data empty
0x17	XRAY interval time
0x18	Filament current limit
0x19	over generator HU
0x1A	over motor HU
0xA0	invalid CMD

## 8.3 GR10X

This section explains the linkage between the VXvue and the GR10X system model.

### Linkage Model

GR10X

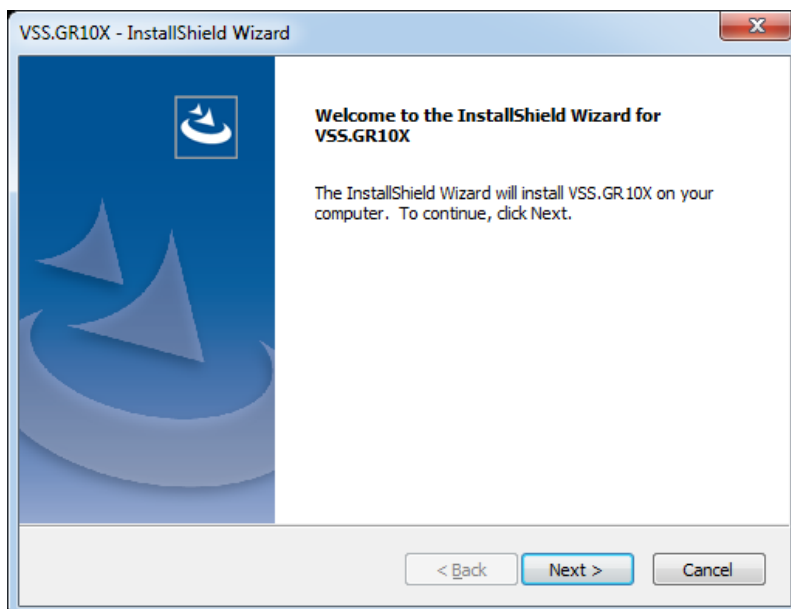
Mapped VXvue Version	System Firmware Ver.
V1.0.2.7	1.0.0.21TS00E14

### 8.3.1 Installing VSS

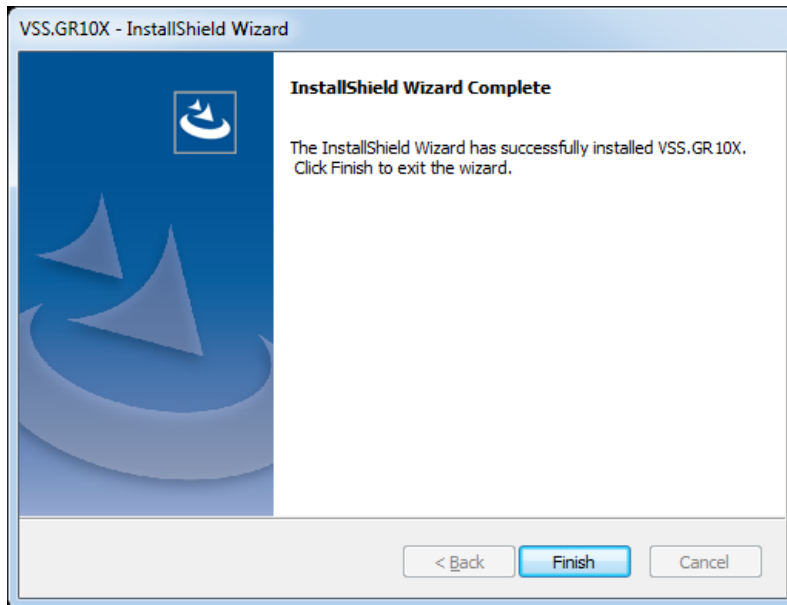


- You should install **VSS.GR10X.Setup.exe** separately to use GR10X system. Contact the person in charge of Vieworks if you need to install the file.

- 1 Install **VXvue**.
- 2 Execute **VSS.GR10X.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing the file.



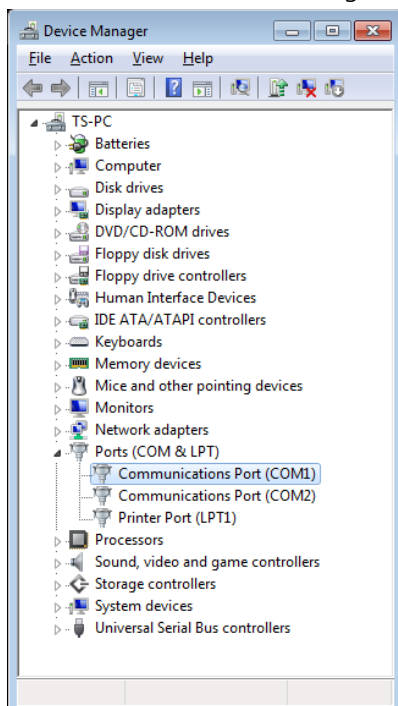
- Click the **Finish** button to complete installation.



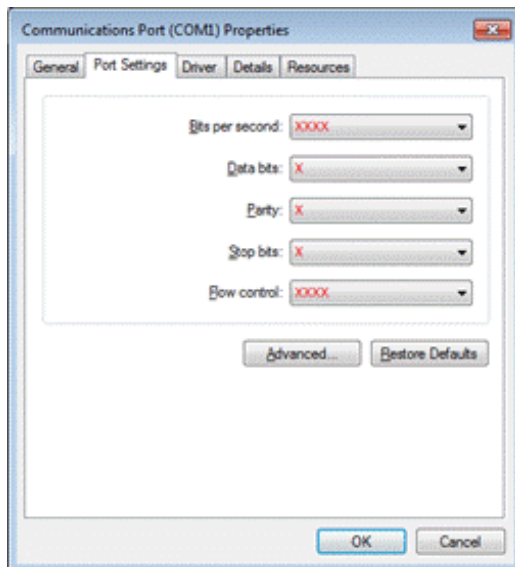
- Check if '[Database of VXvue]\Integration\VSS.GR10X' folder and the sub files are installed successfully.
  - Ex) \Database\Integration\VSS.GR10X\

### 8.3.2 How to Set Port from PC

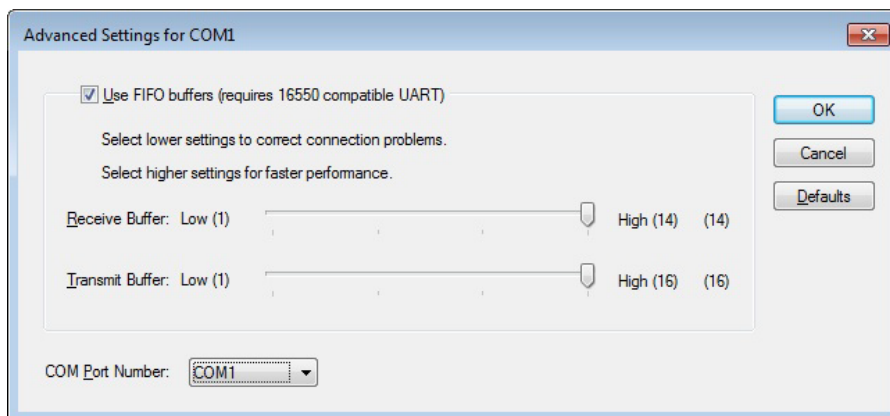
- Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.



- 3 Click the **Port** Settings tab and set each menu as follows. Then click the **Advanced** tab.
- Bit per second: **9600** / Data bits: **8** / Parity: **None** / Stop bits: **1** / Flow control: **None**



- 4 If you need to change the port number, specify the COM Port Number and click the OK button.

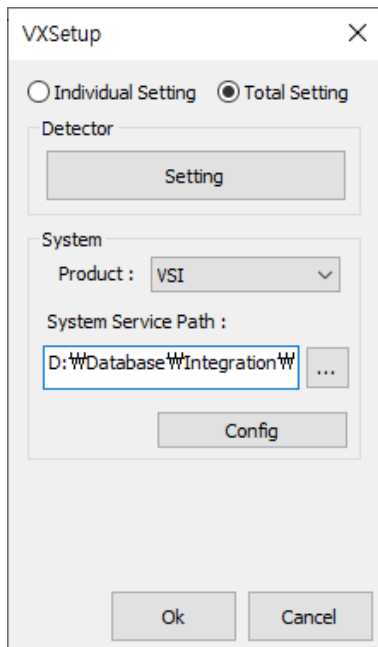


- Input or choose the configured COM port number when you set system in VXSetup.

### 8.3.3 How to Set VSS in VXSetup

#### VXSetup

- 1 Run **VXSetup** and click the **Total Setting** button.



- 2 Choose 'VSI' in the Product menu of **System**.
- 3 Set the System Service Path to [VXvue Database]\\Integration\\VSS.GR10X\\VSS.GR10X.exe.  
▫ Ex) D:\\Database\\Integration\\VSS.GR10X\\VSS.GR10X.exe
- 4 Click the **Config** button to run the equipment setting mode of the system service.
- 5 When the system service equipment setting window is displayed, click the **Ok** button to finish.

### 8.3.4 Device Setting Mode of VXSetup and VXvue

#### VXSetup

- 1 Click the **Config** button of VXSetup System to start the equipment setting mode.

The screenshot shows the 'ConfigurationTool' window. The 'Environment' tab is active, displaying 'Serial Port Number' set to 'COM6' and an 'Echo' button. Below are 'Attachments' buttons for 'AEC' and 'DAP', and 'Integration Mode' buttons for 'APR' and 'Condition'. The 'Dose Table' tab is also visible, showing 'Dose Settings' with 'kVp' minimum at 40 and maximum at 125. Below this are three columns of dose settings: 'mA', 'ms', and 'mAs', each with a list of values and a vertical scrollbar.

- 2 Set the Serial COM Port to be used for communicating with the device.

This close-up shows the 'Environment' section of the configuration tool. The 'Serial Port Number' is set to 'COM1' in a dropdown menu, and the 'Echo' button is visible to its right.

- 3 After selecting the COM Port to use, click the **Echo** button to check the communication status.
  - If connected normally, a 'Connection Success' message appears.
  - If connection fails, a 'Connection Failed' message appears.

- 4 Select the additional device interlocked to the system.

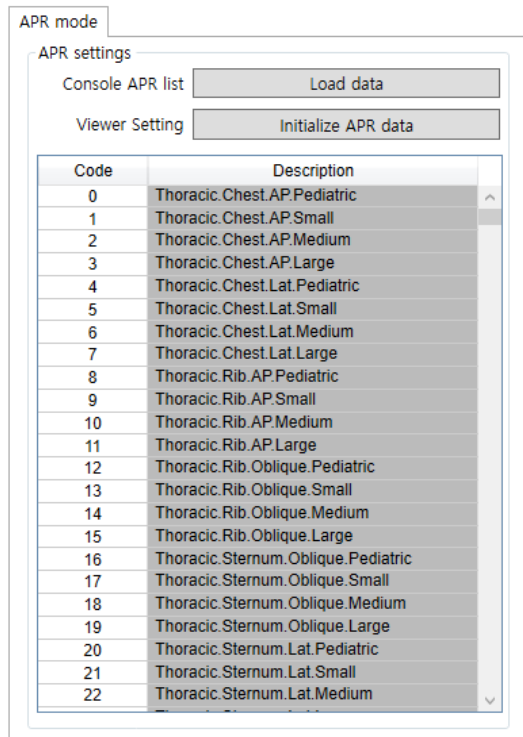
This close-up shows the 'Attachments' section of the configuration tool. It contains two blue buttons: 'AEC' and 'DAP'.

- 5 Select integration mode to control the system.

## APR Mode

If you select the APR mode, You can check APR List supportable from the current system.

- If you click the Load data button from APR List, you can call the APR List configured in Console.
- If you click the Initialize APR data button in Viewer Setting, you can apply the APR data configured in the system to Viewer.



Code	Description
0	Thoracic.Chest.AP.Pediatric
1	Thoracic.Chest.AP.Small
2	Thoracic.Chest.AP.Medium
3	Thoracic.Chest.AP.Large
4	Thoracic.Chest.Lat.Pediatric
5	Thoracic.Chest.Lat.Small
6	Thoracic.Chest.Lat.Medium
7	Thoracic.Chest.Lat.Large
8	Thoracic.Rib.AP.Pediatric
9	Thoracic.Rib.AP.Small
10	Thoracic.Rib.AP.Medium
11	Thoracic.Rib.AP.Large
12	Thoracic.Rib.Oblique.Pediatric
13	Thoracic.Rib.Oblique.Small
14	Thoracic.Rib.Oblique.Medium
15	Thoracic.Rib.Oblique.Large
16	Thoracic.Sternum.Oblique.Pediatric
17	Thoracic.Sternum.Oblique.Small
18	Thoracic.Sternum.Oblique.Medium
19	Thoracic.Sternum.Oblique.Large
20	Thoracic.Sternum.Lat.Pediatric
21	Thoracic.Sternum.Lat.Small
22	Thoracic.Sternum.Lat.Medium

## Condition Mode

If you select the Condition mode, you can set the dose parameter setting from dose setting tab and configure the kV range by Tube model in use.

**Dose Table**

**Dose Settings**

kVp

Minimum: 40 Maximum: 125

mA	ms	mAs
10	1	0.1
11	1.1	0.11
12.5	1.2	0.12
14	1.4	0.14
16	1.6	0.16
18	1.8	0.18
20	2	0.2
22	2.2	0.22
25	2.5	0.25
28	2.8	0.28
32	3.2	0.32
36	3.6	0.36
40	4	0.4
45	4.5	0.45
50	5	0.5
56	5.6	0.63
63	6.3	0.71
71	7.1	0.8
80	8	0.9
90	9	1

6 When settings are complete, click the **Save** button to save the settings.

7 Click the Close button to exit the setting mode.




### VXvue





- Go to **VXvue**의 **Setting** mode > **Integration** > **Detector** panel to change the Icon, displayed on Bucky, to use in each detector.

**Detector Setting**

	Icon	Pixel Pitch	
Detector 1	Detector ▼	-	Correction
Detector 2	Detector ▼	-	Correction
Detector 3	Detector	-	Correction
Detector 4	Stand	-	Correction
	Table		

- The corresponding icon changes in **VXvue** according to the option you select.

Icon	Option
  	Detector

	Stand
	Table
	Table Top
	No Bucky

2 Go to Setting mode > Integration > Bucky panel to map detector by each receptor as follows:

- Up to 5 receptors are supported: TABLE, STAND, TABLE\_TOP, NO\_BUCKY, and CR.

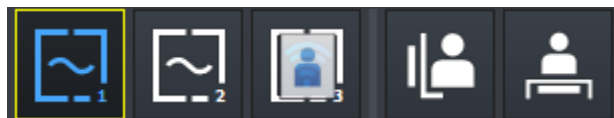
Update Integration - Bucky				
Bucky	Alias	Show Receptor Name	Mapped Detector	Tube
TABLE		Y		
STAND		N		
TABLE_TOP		N		
NO_BUCKY		N	No-Bucky	
CR		N	CR Mode	



- You can map only one detector with one bucky.
- You can map the identical receptor name on multiple buckies.
- You can configure Tube and AEC Chamber Mapping by each bucky.
- A user can configure a desired alias in the column of Alias for each Bucky.
- If one detector maps multiple buckies, the very first mapped-bucky is automatically selected.



- CR Bucky can only map CR Detector.



- Set Show item to Y to display on the VXvue – Exposure screen.
- Once you configure the receptor, **Stand/Table/Table Top/No Bucky** icons are added to the **Detector** icon on VXvue-Exposure mode.

- When selecting the **Receptor** icon, the configure Receptor and the detector mapped to the receptor are automatically set.

### 8.3.5 How to Set System in Procedure Manager of VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**. Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- To automatically configure the system values when selecting Step on Exposure mode, you should input all the system values to use.



- Before Procedure manager execution, run the VSS Configuration tool first for system setting.
- The configured values in VSS Configured tool is reflected on Procedure manager.



- For more information on VSS Configuration tool setting, refer to <8.2.4 Device Setting Mode of VXvue and VXSetup >.

#### When Configured to Condition Mode in VSS Configuration tool

- Set all the system values(Dose Mode / kVp / mAs / mA / ms) to use in all Step.
- Predetermine the system configuration tool, and the changes made in the configuration tool are applied to the procedure manager.

Procedure Manager

Category

Procedure

Stitch Protocol

Step

Bodypart/Projection

Show All

General

Generator

Collimator

Equipment

Search

Setting

Target E.I.

Patient Size

Select All

Copy From

Insert

Edit

Delete

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Center	AEC Right	AEC Density	AEC Film Speed
Abdomen Erect	Large	Current	52	5	100	50	N	N	N	0	Current
Abdomen Erect	Medium	mA/ms	60	5	50	100	N	N	N	0	Current
Abdomen Erect	Small	Current	52	5	100	50	N	N	N	0	Current
Abdomen Erect	Pediatric	Current	52	5	100	50	N	N	N	0	Current
Abdomen KUB	Large	Current	52	5	100	50	N	N	N	0	Current
Abdomen KUB	Medium	mAs	70	14	100	140	N	N	N	0	Current
Abdomen KUB	Small	Current	52	5	100	50	N	N	N	0	Current
Abdomen KUB	Pediatric	Current	52	5	100	50	N	N	N	0	Current
Abdomen Supine	Large	Current	52	5	100	50	N	N	N	0	Current
Abdomen Supine	Medium	Current	56	5	100	50	N	Y	N	2	200
Abdomen Supine	Small	Current	52	5	100	50	N	N	N	0	Current
Abdomen Supine	Pediatric	Current	52	5	100	50	N	N	N	0	Current

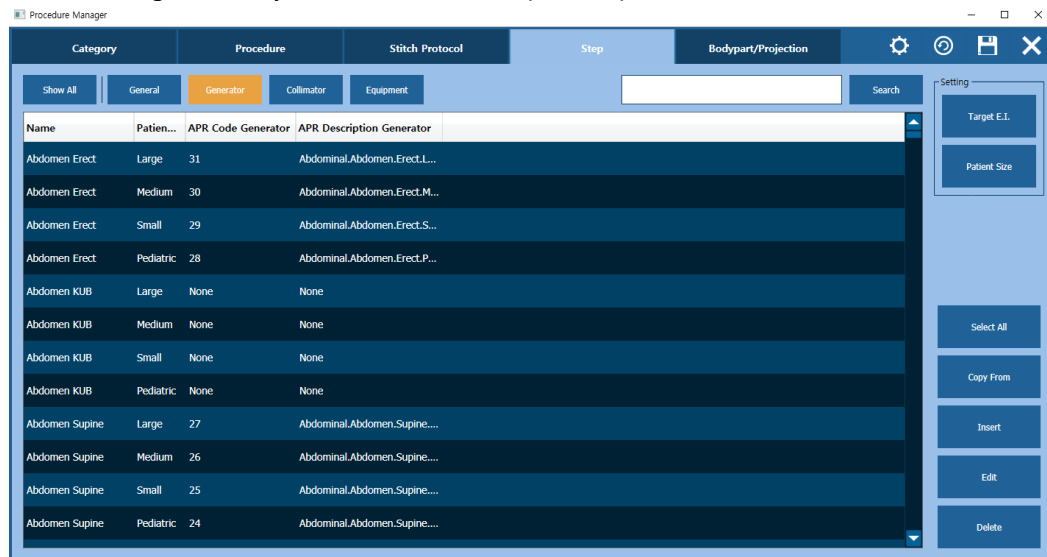


- If only 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of the function that the generator does not support.
- If you select a value other than Current in Dose mode, it automatically switches to the configured Dose mode when Step was selected.

- The output of values in the **AEC Left / Center / Right, AEC Density, AEC Film Speed** columns is determined by the use of **AEC**.

### When Configured to APR Mode in VSS Configuration tool

- After selecting the item you want to edit in Step tab, input the related APR code like below.



Code	APR Description	Code	
0	Thoracic.Chest.AP.Pediatric	145	Cephalic.Nasal bone.Lat.Small
1	Thoracic.Chest.AP.Small	146	Cephalic.Nasal bone.Lat.Medium
2	Thoracic.Chest.AP.Medium	147	Cephalic.Nasal bone.Lat.Large
3	Thoracic.Chest.AP.Large	148	Cephalic.Nasal bone.Axial.Pediatric
4	Thoracic.Chest.Lat.Pediatric	149	Cephalic.Nasal bone.Axial.Small
5	Thoracic.Chest.Lat.Small	150	Cephalic.Nasal bone.Axial.Medium
6	Thoracic.Chest.Lat.Medium	151	Cephalic.Nasal bone.Axial.Large
7	Thoracic.Chest.Lat.Large	152	Cephalic.Zygomatic arch.Lat.Pediatric
8	Thoracic.Rib.AP.Pediatric	153	Cephalic.Zygomatic arch.Lat.Small
9	Thoracic.Rib.AP.Small	154	Cephalic.Zygomatic arch.Lat.Medium
10	Thoracic.Rib.AP.Medium	155	Cephalic.Zygomatic arch.Lat.Large
11	Thoracic.Rib.AP.Large	156	Cephalic.Zygomatic arch.Axial.Pediatric
12	Thoracic.Rib.Oblique.Pediatric	157	Cephalic.Zygomatic arch.Axial.Small
13	Thoracic.Rib.Oblique.Small	158	Cephalic.Zygomatic arch.Axial.Medium
14	Thoracic.Rib.Oblique.Medium	159	Cephalic.Zygomatic arch.Axial.Large
15	Thoracic.Rib.Oblique.Large	160	Cephalic.Mandible.Mandible.Pediatric
16	Thoracic.Sternum.Oblique.Pediatric	161	Cephalic.Mandible.Mandible.Small
17	Thoracic.Sternum.Oblique.Small	162	Cephalic.Mandible.Mandible.Medium
18	Thoracic.Sternum.Oblique.Medium	163	Cephalic.Mandible.Mandible.Large
19	Thoracic.Sternum.Oblique.Large	164	Cephalic.T-M joint.Open Mouth.Pediatric
20	Thoracic.Sternum.Lat.Pediatric	165	Cephalic.T-M joint.Open Mouth.Small

21	Thoracic.Sternum.Lat.Small	166	Cephalic.T-M joint.Open Mouth.Medium
22	Thoracic.Sternum.Lat.Medium	167	Cephalic.T-M joint.Open Mouth.Large
23	Thoracic.Sternum.Lat.Large	168	Upper limbs.Clavicle.AP.Pediatric
24	Abdominal.Abdomen.Supine.Pediatric	169	Upper limbs.Clavicle.AP.Small
25	Abdominal.Abdomen.Supine.Small	170	Upper limbs.Clavicle.AP.Medium
26	Abdominal.Abdomen.Supine.Medium	171	Upper limbs.Clavicle.AP.Large
27	Abdominal.Abdomen.Supine.Large	172	Upper limbs.Clavicle.Axial.Pediatric
28	Abdominal.Abdomen.Erect.Pediatric	173	Upper limbs.Clavicle.Axial.Small
29	Abdominal.Abdomen.Erect.Small	174	Upper limbs.Clavicle.Axial.Medium
30	Abdominal.Abdomen.Erect.Medium	175	Upper limbs.Clavicle.Axial.Large
31	Abdominal.Abdomen.Erect.Large	176	Upper limbs.Scapula.AP.Pediatric
32	Abdominal.Pelvis.AP.Pediatric	177	Upper limbs.Scapula.AP.Small
33	Abdominal.Pelvis.AP.Small	178	Upper limbs.Scapula.AP.Medium
34	Abdominal.Pelvis.AP.Medium	179	Upper limbs.Scapula.AP.Large
35	Abdominal.Pelvis.AP.Large	180	Upper limbs.Scapula.Lat.Pediatric
36	Abdominal.Pelvis.Oblique.Pediatric	181	Upper limbs.Scapula.Lat.Small
37	Abdominal.Pelvis.Oblique.Small	182	Upper limbs.Scapula.Lat.Medium
38	Abdominal.Pelvis.Oblique.Medium	183	Upper limbs.Scapula.Lat.Large
39	Abdominal.Pelvis.Oblique.Large	184	Upper limbs.Shoulder.AP.Pediatric
40	Abdominal.Hip.AP.Pediatric	185	Upper limbs.Shoulder.AP.Small
41	Abdominal.Hip.AP.Small	186	Upper limbs.Shoulder.AP.Medium
42	Abdominal.Hip.AP.Medium	187	Upper limbs.Shoulder.AP.Large
43	Abdominal.Hip.AP.Large	188	Upper limbs.Shoulder.Y.Pediatric
44	Abdominal.Hip.Lat.Pediatric	189	Upper limbs.Shoulder.Y.Small
45	Abdominal.Hip.Lat.Small	190	Upper limbs.Shoulder.Y.Medium
46	Abdominal.Hip.Lat.Medium	191	Upper limbs.Shoulder.Y.Large
47	Abdominal.Hip.Lat.Large	192	Upper limbs.Humerus.AP.Pediatric
48	Abdominal.Hip.Axial.Pediatric	193	Upper limbs.Humerus.AP.Small
49	Abdominal.Hip.Axial.Small	194	Upper limbs.Humerus.AP.Medium
50	Abdominal.Hip.Axial.Medium	195	Upper limbs.Humerus.AP.Large
51	Abdominal.Hip.Axial.Large	196	Upper limbs.Humerus.Lat.Pediatric
52	Spinal.Cervical spine.AP.Pediatric	197	Upper limbs.Humerus.Lat.Small
53	Spinal.Cervical spine.AP.Small	198	Upper limbs.Humerus.Lat.Medium
54	Spinal.Cervical spine.AP.Medium	199	Upper limbs.Humerus.Lat.Large
55	Spinal.Cervical spine.AP.Large	200	Upper limbs.Elbow.AP.Pediatric
56	Spinal.Cervical spine.Lat.Pediatric	201	Upper limbs.Elbow.AP.Small
57	Spinal.Cervical spine.Lat.Small	202	Upper limbs.Elbow.AP.Medium
58	Spinal.Cervical spine.Lat.Medium	203	Upper limbs.Elbow.AP.Large
59	Spinal.Cervical spine.Lat.Large	204	Upper limbs.Elbow.Lat.Pediatric
60	Spinal.Cervical spine.Oblique.Pediatric	205	Upper limbs.Elbow.Lat.Small
61	Spinal.Cervical spine.Oblique.Small	206	Upper limbs.Elbow.Lat.Medium

62	Spinal.Cervical spine.Oblique.Medium	207	Upper limbs.Elbow.Lat.Large
63	Spinal.Cervical spine.Oblique.Large	208	Upper limbs.Forearm.AP.Pediatric
64	Spinal.Cervical spine.Open Mouth.Pediatric	209	Upper limbs.Forearm.AP.Small
65	Spinal.Cervical spine.Open Mouth.Small	210	Upper limbs.Forearm.AP.Medium
66	Spinal.Cervical spine.Open Mouth.Medium	211	Upper limbs.Forearm.AP.Large
67	Spinal.Cervical spine.Open Mouth.Large	212	Upper limbs.Forearm.Lat.Pediatric
68	Spinal.Thoracic spine.AP.Pediatric	213	Upper limbs.Forearm.Lat.Small
69	Spinal.Thoracic spine.AP.Small	214	Upper limbs.Forearm.Lat.Medium
70	Spinal.Thoracic spine.AP.Medium	215	Upper limbs.Forearm.Lat.Large
71	Spinal.Thoracic spine.AP.Large	216	Upper limbs.Wrist.AP.Pediatric
72	Spinal.Thoracic spine.Lat.Pediatric	217	Upper limbs.Wrist.AP.Small
73	Spinal.Thoracic spine.Lat.Small	218	Upper limbs.Wrist.AP.Medium
74	Spinal.Thoracic spine.Lat.Medium	219	Upper limbs.Wrist.AP.Large
75	Spinal.Thoracic spine.Lat.Large	220	Upper limbs.Wrist.Lat.Pediatric
76	Spinal.Thoracic spine.Oblique.Pediatric	221	Upper limbs.Wrist.Lat.Small
77	Spinal.Thoracic spine.Oblique.Small	222	Upper limbs.Wrist.Lat.Medium
78	Spinal.Thoracic spine.Oblique.Medium	223	Upper limbs.Wrist.Lat.Large
79	Spinal.Thoracic spine.Oblique.Large	224	Upper limbs.Hand.AP.Pediatric
80	Spinal.Lumbar spine.AP.Pediatric	225	Upper limbs.Hand.AP.Small
81	Spinal.Lumbar spine.AP.Small	226	Upper limbs.Hand.AP.Medium
82	Spinal.Lumbar spine.AP.Medium	227	Upper limbs.Hand.AP.Large
83	Spinal.Lumbar spine.AP.Large	228	Upper limbs.Hand.Lat.Pediatric
84	Spinal.Lumbar spine.Lat.Pediatric	229	Upper limbs.Hand.Lat.Small
85	Spinal.Lumbar spine.Lat.Small	230	Upper limbs.Hand.Lat.Medium
86	Spinal.Lumbar spine.Lat.Medium	231	Upper limbs.Hand.Lat.Large
87	Spinal.Lumbar spine.Lat.Large	232	Lower limbs.Femur.AP.Pediatric
88	Spinal.Lumbar spine.Oblique.Pediatric	233	Lower limbs.Femur.AP.Small
89	Spinal.Lumbar spine.Oblique.Small	234	Lower limbs.Femur.AP.Medium
90	Spinal.Lumbar spine.Oblique.Medium	235	Lower limbs.Femur.AP.Large
91	Spinal.Lumbar spine.Oblique.Large	236	Lower limbs.Femur.Lat.Pediatric
92	Spinal.Sacrum/Coccyx.AP.Pediatric	237	Lower limbs.Femur.Lat.Small
93	Spinal.Sacrum/Coccyx.AP.Small	238	Lower limbs.Femur.Lat.Medium
94	Spinal.Sacrum/Coccyx.AP.Medium	239	Lower limbs.Femur.Lat.Large
95	Spinal.Sacrum/Coccyx.AP.Large	240	Lower limbs.Knee.AP.Pediatric
96	Spinal.Sacrum/Coccyx.Lat.Pediatric	241	Lower limbs.Knee.AP.Small
97	Spinal.Sacrum/Coccyx.Lat.Small	242	Lower limbs.Knee.AP.Medium
98	Spinal.Sacrum/Coccyx.Lat.Medium	243	Lower limbs.Knee.AP.Large
99	Spinal.Sacrum/Coccyx.Lat.Large	244	Lower limbs.Knee.Lat.Pediatric
100	Spinal.Whole Spine AP.C-spine	245	Lower limbs.Knee.Lat.Small
101	Spinal.Whole Spine AP.C-spine	246	Lower limbs.Knee.Lat.Medium
102	Spinal.Whole Spine AP.C-spine	247	Lower limbs.Knee.Lat.Large

103	Spinal.Whole Spine AP.C-spine	248	Lower limbs.Knee.SkyLine.Pediatric
104	Spinal.Whole Spine AP.T-spine	249	Lower limbs.Knee.SkyLine.Small
105	Spinal.Whole Spine AP.T-spine	250	Lower limbs.Knee.SkyLine.Medium
106	Spinal.Whole Spine AP.T-spine	251	Lower limbs.Knee.SkyLine.Large
107	Spinal.Whole Spine AP.T-spine	252	Lower limbs.Tibia.AP.Pediatric
108	Spinal.Whole Spine AP.L-spine	253	Lower limbs.Tibia.AP.Small
109	Spinal.Whole Spine AP.L-spine	254	Lower limbs.Tibia.AP.Medium
110	Spinal.Whole Spine AP.L-spine	255	Lower limbs.Tibia.AP.Large
111	Spinal.Whole Spine AP.L-spine	256	Lower limbs.Tibia.Lat.Pediatric
112	Spinal.Whole Spine LaT.C-spine	257	Lower limbs.Tibia.Lat.Small
113	Spinal.Whole Spine LaT.C-spine	258	Lower limbs.Tibia.Lat.Medium
114	Spinal.Whole Spine LaT.C-spine	259	Lower limbs.Tibia.Lat.Large
115	Spinal.Whole Spine LaT.C-spine	260	Lower limbs.Ankle.AP.Pediatric
116	Spinal.Whole Spine LaT.T-spine	261	Lower limbs.Ankle.AP.Small
117	Spinal.Whole Spine LaT.T-spine	262	Lower limbs.Ankle.AP.Medium
118	Spinal.Whole Spine LaT.T-spine	263	Lower limbs.Ankle.AP.Large
119	Spinal.Whole Spine LaT.T-spine	264	Lower limbs.Ankle.Lat.Pediatric
120	Spinal.Whole Spine LaT.L-spine	265	Lower limbs.Ankle.Lat.Small
121	Spinal.Whole Spine LaT.L-spine	266	Lower limbs.Ankle.Lat.Medium
122	Spinal.Whole Spine LaT.L-spine	267	Lower limbs.Ankle.Lat.Large
123	Spinal.Whole Spine LaT.L-spine	268	Lower limbs.Calcaneus.Axial.Pediatric
124	Cephalic.Skull.AP.Pediatric	269	Lower limbs.Calcaneus.Axial.Small
125	Cephalic.Skull.AP.Small	270	Lower limbs.Calcaneus.Axial.Medium
126	Cephalic.Skull.AP.Medium	271	Lower limbs.Calcaneus.Axial.Large
127	Cephalic.Skull.AP.Large	272	Lower limbs.Foot.AP.Pediatric
128	Cephalic.Skull.Lat.Pediatric	273	Lower limbs.Foot.AP.Small
129	Cephalic.Skull.Lat.Small	274	Lower limbs.Foot.AP.Medium
130	Cephalic.Skull.Lat.Medium	275	Lower limbs.Foot.AP.Large
131	Cephalic.Skull.Lat.Large	276	Lower limbs.Foot.Oblique.Pediatric
132	Cephalic.Skull.Town's.Pediatric	277	Lower limbs.Foot.Oblique.Small
133	Cephalic.Skull.Town's.Small	278	Lower limbs.Foot.Oblique.Medium
134	Cephalic.Skull.Town's.Medium	279	Lower limbs.Foot.Oblique.Large
135	Cephalic.Skull.Town's.Large	280	Lower limbs.Toe.AP.Pediatric
136	Cephalic.P.N.S.Water's.Pediatric	281	Lower limbs.Toe.AP.Small
137	Cephalic.P.N.S.Water's.Small	282	Lower limbs.Toe.AP.Medium
138	Cephalic.P.N.S.Water's.Medium	283	Lower limbs.Toe.AP.Large
139	Cephalic.P.N.S.Water's.Large	284	Lower limbs.Toe.Lat.Pediatric
140	Cephalic.P.N.S.Cladwell.Pediatric	285	Lower limbs.Toe.Lat.Small
141	Cephalic.P.N.S.Cladwell.Small	286	Lower limbs.Toe.Lat.Medium
142	Cephalic.P.N.S.Cladwell.Medium	287	Lower limbs.Toe.Lat.Large
143	Cephalic.P.N.S.Cladwell.Large	288	Extra field.Bodypart.Projection

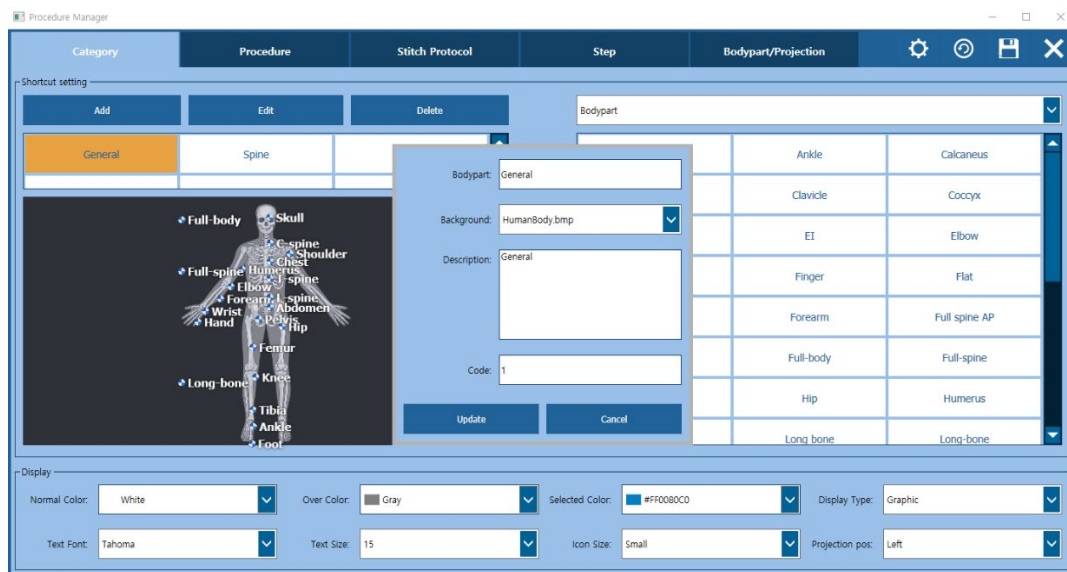
144 Cephalic.Nasal bone.Lat.Pediatric

...



- Basic APR setting supported by GR10X System ranges from 0 to 287.
- User can temporarily set 288 through 687 of APR Code to Bodypart/Procedure and refer to System Setup Manual for more information.

- Select the item you want to edit in Category tab and click the Edit button to input the relevant code like below.



Category	Code
Body	0
General	1
Spine	2
Skull	3
Upper Ext.	4
Low Ext.	5
Extra field	7

- Click the **BodyArea / View** item you want to edit in **Bodypart/Projection Tab** and input the relevant number like below.

Procedure Manager															
Category		Procedure		Stitch Protocol		Step		Bodypart/Projection							
Meaning	Alias	Hide	CodeValue	Designator	Version	BodypartExa...	BodyArea	Meaning	Alias	Hide	CodeValue	Designator	Version	ViewPosition	View
Abdomen		N	T-D4000	SRT		ABDOMEN	1	frontal		N	R-10202	SRT		FRONTAL	1
Abdomen and Pel...		N	R-FAB57	SRT		ABDOMENPEL...	2	frontal oblique		N	R-10204	SRT		FRONTAL OBLIQUE	2
Acromioclavicular...		N	T-15420	SRT		ACROMIOCLAV...	3	antero-posterior	AP	N	R-10206	SRT		AP	3
Ankle joint	Ankle	N	T-15750	SRT		ANKLE	4	antero-posterior...	AP-Oblique	N	R-10208	SRT		ANTERO_POSTER...	4
Apex of Lung	Apex	N	T-280A0	SRT		APEX OF LUNG	5	right posterior o...	RP-Oblique	N	R-10210	SRT		RIGHT POSTERIOR	5
Arm		N	T-D8200	SRT		ARM	6	left posterior ob...	LP-Oblique	N	R-10212	SRT		LEFT POSTERIOR...	6
Bile duct		N	T-60610	SRT		BILE DUCT	7	postero-anterior	PA	N	R-10214	SRT		PA	7
Bladder		N	T-74000	SRT		BLADDER	8	postero-anterior...	PA-Oblique	N	R-10216	SRT		POSTERO_ANTER...	8
Breast		N	T-04000	SRT		BREAST	9	right anterior o...	RA-Oblique	N	R-10218	SRT		RIGHT ANTERIO...	9
Bronchus		N	T-26000	SRT		BRONCHUS	10	left anterior obli...	LA-Oblique	N	R-10220	SRT		LEFT ANTERIOR...	10
Calcaneus		N	T-12770	SRT		CALCANEUS	11	sagittal		N	R-10222	SRT		SAGITTAL	11
Cervical spine	C-spine	N	T-11501	SRT		CSPINE	12	medial-lateral		N	R-10224	SRT		MEDIAL_LATERAL	12

Bodypart	BodyArea	Bodypart	BodyArea
Abdomen	1	Mastoid bone	52
Abdomen and Pelvis	2	Maxilla	53
Acromioclavicular joint	3	Mediastinum	54
Ankle joint	4	Nasal bone	55
Apex of Lung	5	Neck	56
Arm	6	Neck and Chest	57
Bile duct	7	Neck, Chest and Abdomen	58
Bladder	8	Neck, Chest, Abdomen and Pelvis	59
Breast	9	Optic canal	60
Bronchus	10	Orbital structure	61
Calcaneus	11	Pancreatic duct and bile duct systems	62
Cervical spine	12	Paranasal sinus	63
Cervico-thoracic spine	13	Parotid gland	64
Chest	14	Patella	65
Chest and Abdomen	15	Pelvis	66
Chest, Abdomen and Pelvis	16	Pelvis and lower extremities	67
Clavicle	17	Prostate	68
Coccyx	18	Rectum	69
Colon	19	Rib	70
Duodenum	20	Sacroiliac joint	71
Elbow	21	Sacrum	72
Entire body	22	Scapula	73
Esophagus	23	Sella turcica	74
Esophagus, stomach and duodenum	24	Sesamoid bones of foot	75
Extremity	25	Shoulder	76

Eye	26	Skull	77
Eye region	27	Small intestine	78
Facial bones	28	Spine	79
Femur	29	Sternoclavicular joint	80
Finger	30	Sternum	81
Foot	31	Stomach	82
Forearm bone	32	Submandibular gland	83
Gall bladder	33	Tarsal joint	84
Hand	34	Temporomandibular joint	85
Head	35	Thoracic spine	86
Head and Neck	36	Thoraco-lumbar spine	87
Heart	37	Thumb	88
Hip joint	38	Toe	89
Humerus	39	Trachea	90
Ileum	40	Upper urinary tract	91
Ilium	41	Ureter	92
Internal Auditory Canal	42	Urethra	93
Jaw region	43	Uterus and fallopian tubes	94
Jejunum	44	Vertebral column and cranium	95
Knee	45	Wrist joint	96
Large intestine	46	Zygomatic arch	97
Larynx	47	Implant VIEW	98
Leg	48	Full spine AP	99
Lumbar spine	49	Long bone	100
Lumbo-sacral spine	50	Full spine Lat	101
Mandible	51		

Projection	View	Projection	View
frontal	1	dorsoplantar	34
frontal oblique	2	parietoacanthial	35
antero-posterior	3	acanthioparietal	36
antero-posterior oblique	4	orbitoparietal	37
right posterior oblique	5	parieto-orbital	38
left posterior oblique	6	latero-medial oblique	39
postero-anterior	7	medio-lateral oblique	40
postero-anterior oblique	8	tissue specimen	41
right anterior oblique	9	Erect	42
left anterior oblique	10	Supine	43
sagittal	11	Towns	44
medial-lateral	12	Sky line	45

lateral oblique	13	Waters	46
lateral-medial	14	Caldwell	47
medial oblique	15	Extension	48
right lateral	16	Flexion	49
right oblique	17	KUB	50
left lateral	18	C-spine AP	51
left oblique	19	C-T spine AP	52
axial	20	T-spine AP	53
cranio-caudal	21	T-L spine AP	54
caudo-cranial	22	L-spine AP	55
oblique axial	23	L-S spine AP	56
oblique cranio-caudal	24	C-spine Lat	57
oblique caudo-cranial	25	C-T spine Lat	58
frontal-oblique axial	26	T-spine Lat	59
sagittal-oblique axial	27	T-L spine Lat	60
oblique	28	L-spine Lat	61
lateral	29	L-S spine Lat	62
tangential	30	Femur AP	63
submentovertical	31	Knee AP	64
verticosubmental	32	Leg AP	65
plantodorsal	33	Open mouth	66

### How to Check Linkage

- Check if the relevant menu is applied in VXvue after selecting Step or Category of GR10X system console software.
- It means that the selected Step or Category in VXvue is applied to GR10X system control console and successfully linked.



- You can set APR values supported by GR10X System on automatic. For more information, refer to <8.3.4 Device Setting Mode of VXSetup and VXvue>.
- Step without mapped APR code is set as a basic exposure value.

### 8.3.6 How to Use GR10X System in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.







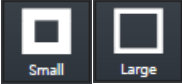


- Check the following status if generator control UI is not indicated.
  - Check if the power of system is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check if the generator and PC are connected normally. (Ex. port setting, etc.)

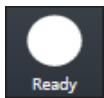
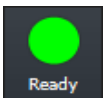

- You can perform the following functions:
  - Using AEC function
  - Adjusting kVp and mAs
  - Adjusting mA and ms instead of mAs

Items	Image			
2 points	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼
3 points	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼
AEC	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼

## Icons

The disabled UIs are not supported when integrated with the GR10X system.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> and <b>mAs</b> can be adjusted.
	AEC	Enable to use AEC function
	AEC Field (Left / Center / Right)	You can select the AEC field you want to use. <ul style="list-style-type: none"> <li>Default: Center</li> <li>Available to select multiple <b>AEC</b> fields.</li> </ul>
	Density	Enable to adjust the <b>AEC Density</b> .
	Film / Screen	Enable to set the <b>Sensitivity</b> of the <b>AEC</b> file/screen: 100, 200, 400, 800
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	When an error occurs that can be solved by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>Click this icon at this time to start reset.</li> </ul>
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>0&lt;HU≤50: Green</li> <li>50&lt;HU≤80: Yellow</li> <li>80&lt;HU: Red</li> </ul>

<div>  Ready  Ready  Shot </div> <div><b>X-ray Status</b></div>	<p>The icons and their color are changed depending on the status of generator.</p> <ul style="list-style-type: none"> <li>• Ready (White) - Standby</li> <li>• Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>• Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
--	--



- Refer to VXvue Operation Manual or VXvue Service Manual for the details in VXvue.

### Error Message

The general error and warning messages are indicated as slides.

- Red color : error / Yellow color : warning

## 8.3.7 Error and Warning Messages of GR10X Mobile



- If the error message still appears even after clicking the **Reset** button or rebooting the system, contact the manufacturer.

- Recoverable Error: The **Reset** button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.
- **You can check a type of error or warning message by identifying the last 4 numbers of the Error Code shown in VXvue.**

### Error Message

Code	Error Message
0001	Console Invalid Command
0002	Door Interlock
0003	Interlock
0004	Prep Timeout
0005	Ready Timeout
0006	Filament Timeout
0007	No Library Data
0008	No Calibration Data
0009	SW Configuration File Empty
0010	Calibration Manually Terminated
0011	Manually Terminate Exposure
0012	PREP Manually Terminate

0013	Seasoning Manually Terminated
0014	AC Voltage UVP
0015	Bucky ready open
0017	Not get AEC Ramp
0018	AEC calibration over range
0019	AEC exposure time out
0020	Snap over power rating
1001	SW OTP
1002	Thermal Switch
1003	XRAY Over HU
1004	Aux Power Off
1005	DR reset fail
1006	DR ready fail
1007	Battery communication loss
1008	AEC & DAP Communication interrupt
1009	Fluoroscopic time out
1010	DAP device error
1011	Snap over time
2001	SW Vout OVP
2002	SW Vout UVP
2003	SW Anode OCP
2004	SW Anode UCP
2005	Input Voltage OVP
2006	Input Voltage UVP
2007	24VDC UVP
2008	HW Vout OVP
2009	Capacitive Protection
2010	Primary OCP
2011	HW Cathode OCP
2012	HW Anode OCP
2013	Charger OTP
2014	PFC BUS UVP
2015	Flow fault
2016	PFC start fail
3001	SW Thermal sense fault
3002	Fan 1 Fault
3003	Fan 2 Fault
3004	Filament Power Fault
3005	Soft Start Fail
3006	Ma Test Point Open
3007	Tank Connect

<b>3008</b>	Self Test Error
<b>3009</b>	Motor Short
<b>3010</b>	Motor invalid command
<b>3011</b>	Motor OCP1
<b>3012</b>	Motor OCP2
<b>3013</b>	Motor Communication Loss
<b>3014</b>	Motor Main Open
<b>3015</b>	Motor Shift Open
<b>3016</b>	Charger Fail
<b>3017</b>	Bus UVP
<b>3018</b>	Battery UVP
<b>3019</b>	Cart UVP
<b>3020</b>	Inverter error
<b>3021</b>	Discharge Relay Fail
<b>3022</b>	Battery OVP
<b>3023</b>	Battery OCP
<b>3024</b>	Battery OTP
<b>3025</b>	Battery Fail
<b>3026</b>	APS1 Fail
<b>3027</b>	APS2 Fail
<b>3028</b>	APS3 Fail
<b>3029</b>	Capacitor error
<b>3030</b>	Fan 3 Fault
<b>3031</b>	Fan 4 Fault
<b>3032</b>	PFC OTP and Brown out
<b>4001</b>	SW Current Unbalance
<b>4002</b>	SW Filament OCP
<b>4003</b>	Shoot Inv1
<b>4004</b>	Shoot Inv2
<b>4005</b>	HW Filament Rms
<b>4006</b>	Error Repeat 5 Times
<b>8001</b>	Release exposure switch
<b>8002</b>	No exposure switch after PREP
<b>8003</b>	No detector
<b>8004</b>	Cannot check detector
<b>8005</b>	Tube Stand com error
<b>8006</b>	Exposure lock by generator
<b>8007</b>	The exposure time of the system exceeds the exposure time of the detector.

8008	Bucky Table com error
8009	Bucky Stand com error
8010	Console no apr index
8011	Console no apr data
8012	Console out of apr index
8501	mode inhibited
8502	out of tube rating
8503	out of power
8504	out of work
8505	out of voltage range
8506	out of current range
8507	out of time range
8508	out of mAs
8509	time too small
8511	mAs too small
8512	no CMD
8513	data not complete (reserved)
8514	over tube HU
8515	out of filament current range
8516	no library data
8517	tube PN not match
8518	focal spot not support
8519	data break
8520	EEPROM BUSY
8521	exposure result empty
8522	tube calibration data empty
8523	XRAY interval time
8524	Filament current limit
8525	over generator HU
8526	over moter HU
8533	Parameters setting of radiographic is wrong when user press hand switch
8534	Parameters of radiographic is not setting when user press hand switch
8540	Exposure start when generator is not ready
8541	Generator power off
8550	Generator no response
8551	No start preheat
8552	No ready signal
8553	No start x-ray signal

8554	No end x-ray signal
8660	Invalid CMD

## 8.4 Micro-X Rover

This section explains the linkage between the VXvue and the Rover, the mobile system of Micro-X.

### Linkage Model

Micro-X Rover (Mobile System)

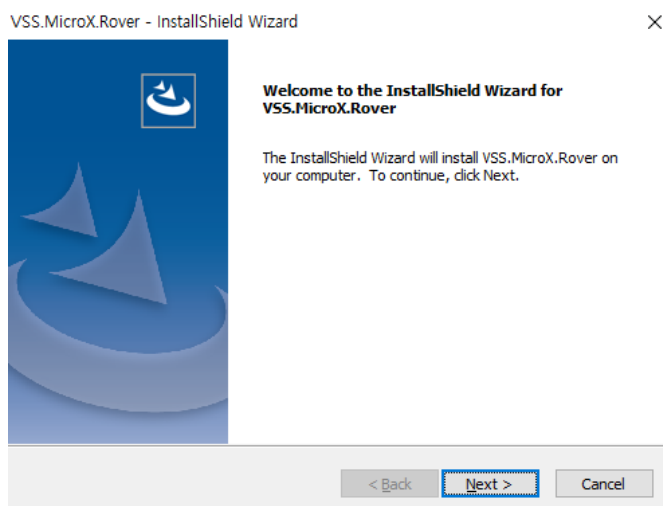
Mapped VXvue version	Software(SDK) version	Hardware version
V1.0.2.7	1.11.0.56199	R08

### 8.4.1 Installing VSS



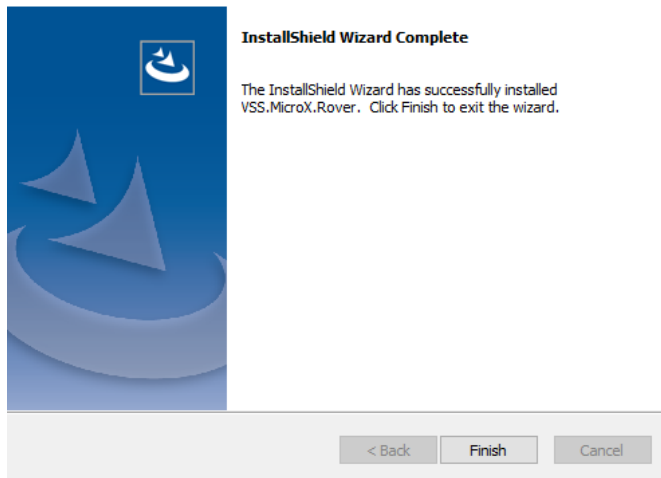
- You should separately install **VSS.MicroX.Rover.Setup.exe** to use Rover system. Contact the person in charge of Vieworks if you need to install the file.

- 1 Install **VXvue**.
- 2 Execute **VSS.MicroX.Rover.Setup.exe** file as an administrator mode.
- 3 Click the **Install** button to start installing the file.



- 4 Click the **Finish** button to complete installation.

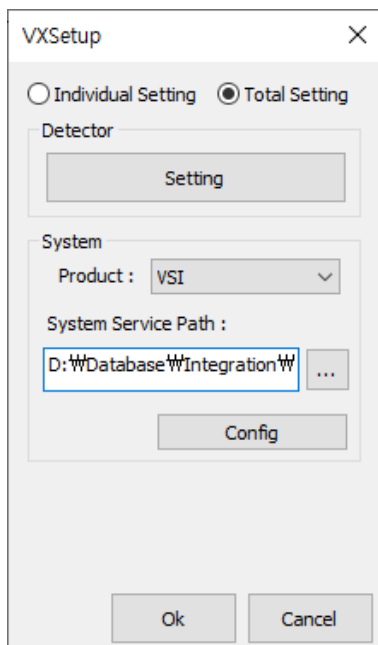
VSS.MicroX.Rover - InstallShield Wizard



- 5 Check if **[Database of VXvue]WIntegrationWVSS.MicroX.Rover** folder and the sub files are installed successfully.
  - e.g. D:WDatabaseWIntegrationWVSS.MicroX.RoverW

## 8.4.2 How to Set VSS in VXSetup

- 1 Run **VXSetup** and click the **Total Setting** button.



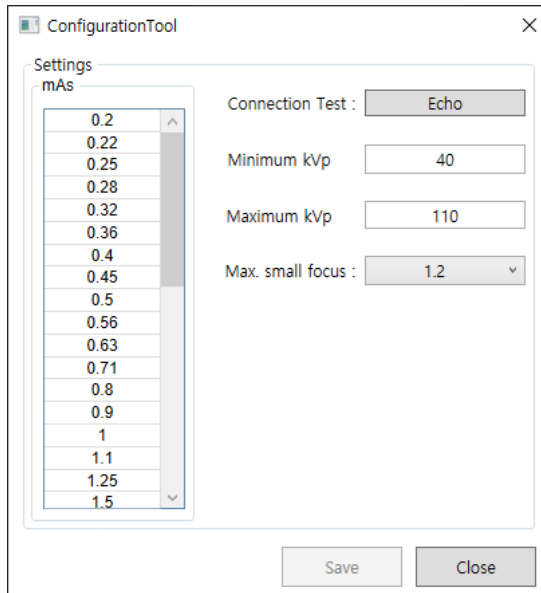
- 2 Choose 'VSI' in the Product menu of **System**.
- 3 Set the System Service Path to [Database of VXvue]WIntegrationWVSS.MicroX.RoverWVSS.MicroX.Rover.exe.
  - e.g. D:WDatabaseWIntegrationWVSS.MicroX.RoverWVSS.MicroX.Rover.exe

- 4 Click the **Config** button to run the equipment setting mode of the system service.
- 5 When the system service equipment setting window is displayed, click the **Ok** button to finish.

### 8.4.3 Device Setting Mode of VXSetup and VXvue

#### VXSetup

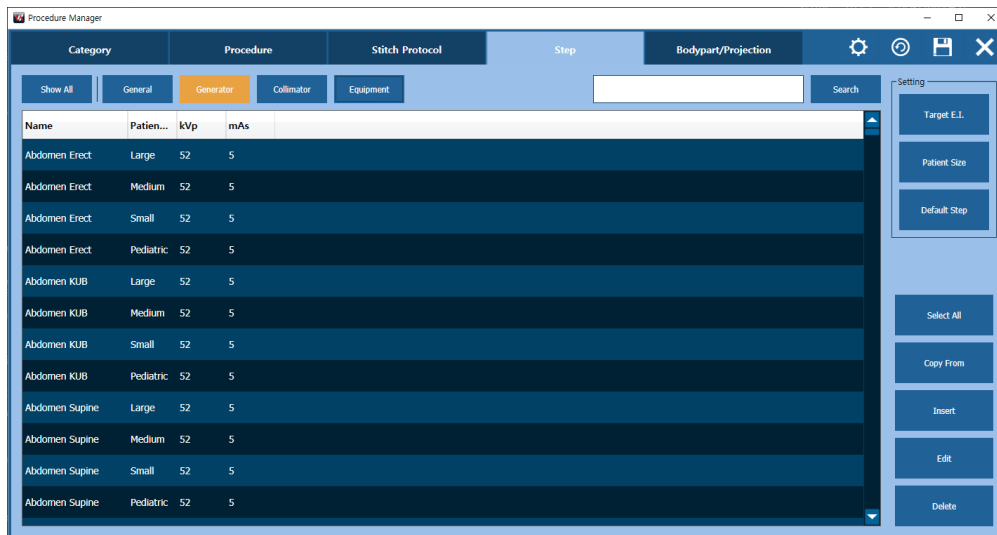
- 1 Click the **Config** button of VXSetup System to start the equipment setting mode.



- 2 Click the **Echo** button to check the communication status.
  - If connection is successful, a 'Connection Success' message appears.
  - If connection fails, a 'Connection Failed' message appears.
- 3 Edit each item values in Settings to adjust Dose Parameter.
  - You can change maximum/minimum value of kVp from the Edit windows of Minimum/Maximum kVp.
  - Double-click the item on the list to edit the range value of mAs.
  - Right-click the mAs list to add or delete the mAs value.
- 4 Edit the maximum value of Small Focal Spot in Max.small focus.
  - Focal Spot value is what the generator transmits to after Dose adjustment.
  - In VXvue, values up to the determined value are denominated as Small Focal Spot Size, while values larger than the determined value are denominated as Large Focal Spot Size.
- 5 Click the Save button once the setting is complete.
- 6 Click the Close button to end the Setting mode.

### 8.4.4 How to Set System in Procedure Manager of VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**. Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- To automatically configure the system values when selecting Step on Exposure mode, you should input all the system values to use.



- Select the Generator button at the top in the **Step Tab** to only display the Generator-related values.
- It is unavailable to configure the values of the feature the system does not support.

### 8.4.5 How to Use System in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.







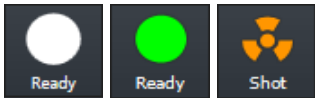
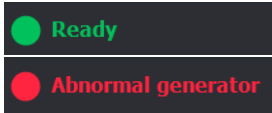
- Check the following status if generator control UI is not indicated.
  - Check if the equipment is successfully connected via the service program.

- You can perform the following functions:
  - Adjusting kVp and mAs

Items	Image			
2 points	70	kVp	▲ ▼	20
	200	mA	▲ ▼	100

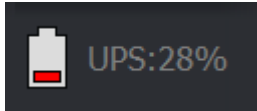
## Icons

The disabled UIs are not supported when integrated with the GR10X system.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	When an error occurs that can be solved by resetting the system, the <b>Reset</b> icon is activated with displaying an error message. <ul style="list-style-type: none"> <li>Click this icon at this time to start reset.</li> </ul>
	Wait time to enable the next shot	Displays standby time until the next image acquisition. <ul style="list-style-type: none"> <li>Green <ul style="list-style-type: none"> <li>When the remaining time is between 0 and 10 seconds. Changes every 1 second.</li> </ul> </li> <li>Yellow <ul style="list-style-type: none"> <li>When the remaining time is between 11 and 30 seconds. Changes every 5 seconds.</li> <li>When the remaining time is between 31 and 60. Changes every 10 seconds.</li> <li>When the remaining time is longer than 60 seconds. Changes every 60 seconds.</li> </ul> </li> </ul>
	X-ray Status	The icons and their color are changed depending on the status of generator. <ul style="list-style-type: none"> <li>Ready (White) - Standby</li> <li>Ready (Green) – Completing preparation of X-ray exposure after pressing the 1st level switch (Ready) of the generator.</li> <li>Shot (Yellow) – Exposing X-ray by pressing the 2nd level switch (Exposure) of the generator.</li> </ul>
	Exposure Enable	Depending on the generator, detector, and viewer status, the status of shooting and image acquisition is displayed at the bottom of the screen. <ul style="list-style-type: none"> <li><b>Green</b> – Recording is possible (Ex. Ready, etc.)</li> <li><b>Yellow</b> – Shooting is possible (Ex. Image Processing), but other tasks are in progress.</li> <li><b>Red</b> – Recording is not possible, and images cannot be obtained. (Ex. Not ready, Abnormal generator, etc.)</li> </ul>







### 8.4.6 How to Check Battery Remains in VXvue

You can check the remaining UPS battery level in the lower right-hand corner of the status bar.



The battery icon image changes by the selected option in VXvue.

- When the remaining battery level is 19% or lower(value varies by system setting), the low battery warning pops up.
- When the remaining battery level is 9% or lower(value varies by system setting), the battery-is-about-to-die warning pops up.
- When the remaining battery level is 7% or lower(value varies by system setting), the system sends a termination signal, and the VXvue and the system are shut down within 5 minutes.
- When charging, the warning message related to battery remains do not appear, and the charging icon image displays.

Icon	Battery Remains
	Charging
	91~100%
	66~90%
	36~65%
	11~35%
	0~10%

### 8.4.7 Error and Warning Messages of GR10X Mobile

- Recoverable Error: The **Reset** button becomes activated. Click the button for troubleshooting.
- Unrecoverable Error: Shut down VXvue, fix the generator issue and reboot.
- You can check a type of error or warning message by identifying the last 4 numbers of the Error Code shown in VXvue.



- If the error message still appears even after clicking the **Reset** button or rebooting the system, contact the manufacturer.

#### Error Message

Code	Description
1000	InvalidState
1001	CancelledExposure
1002	PSCCommunicationsError
1003	PostExposureParametersMissing
1004	FPDCommunicationsError
1005	DAP_CommunicationsError
1006	DAP_DeviceFailure
1007	DAP_SyntaxError
1008	DAP_HV_Error
1009	DAP_ZeroCheckError
1010	DAP_EEPROM_Error
1011	SoftwareError
1012	CPU_FanStalled
1013	ServiceExposureDataAlert
1014	ServiceBatteryDataAlert
1015	ConfigurationError
1016	PSC_CriticalError
1017	FPD_CriticalError
1018	PSC_Shutdown
1019	COM_OverTemperature
1020	COM_UnderTemperature
1021	COM_FanOverspeed
1022	PSC_RecoveryFailed
1023	XRS_CriticalError
1024	FPDC_RecoveryFailed
1025	EEPROM_ConfigError
1026	XRS_CalibrationError
1027	XRS_Low_mA_Nonfire

1028	XRS_Focus_kV_present_during_standby_Nonfire
1029	XRS_Anode_mA_Overcurrent_Trip_Nonfire
1030	XRS_Anode_kV_Overvoltage_Trip_Nonfire
1031	XRS_Resonant_Current_Trip_Nonfire
1032	XRS_Grid_Fault_Nonfire
1033	XRS_Anode_Arc_Detect_Nonfire
1034	XRS_Tube_Focus_Fault_Nonfire
1035	XRS_mAs_Intergration_circuit_timesout_Nonfire
1036	XRS_Grid_over_Current_Fault_Nonfire
1037	XRS_Manually_terminated_exposure__Nonfire
1038	XRS_General_Nonfire
1039	XRS_Low_mA_Misfire
1040	XRS_Focus_kV_present_during_standby_Misfire
1041	XRS_Anode_mA_Overcurrent_Trip_Misfire
1042	XRS_Anode_kV_Overvoltage_Trip_Misfire
1043	XRS_Resonant_Current_Trip_Misfire
1044	XRS_Grid_Fault_Misfire
1045	XRS_Anode_Arc_Detect_Misfire
1046	XRS_Tube_Focus_Fault_Misfire
1047	XRS_mAs_Intergration_circuit_timesout_Misfire
1048	XRS_Grid_over_Current_Fault_Misfire
1049	XRS_Manually_terminated_exposure__Misfire
1050	XRS_General_Misfire
2000	PSC_POST_Failure_STM32
2001	PSC_POST_Failure_SOC_Controller
2002	PSC_POST_Failure_LED_Bar_Driver
2003	PSC_POST_Failure_PCA9547_I2C_Multiplexer
2004	PSC_POST_Failure_FRAM
2005	PSC_POST_Failure_PCA9537_IO_Expander
2006	PSC_POST_Failure_AMC6821_Fan_Controller_LBD
2007	PSC_POST_Failure_AMC6821_Fan_Ctrl_PC
2008	PSC_POST_Failure_AMC6821_Fan_Ctrl_BATMAN
2009	PSC_POST_Failure_EEPROM_LBD
2010	PSC_POST_Failure_EEPROM_PC
2011	PSC_POST_Failure_EEPROM_BATMAN
2012	PSC_POST_Failure_PCA9554_IO_Expander_LBD
2013	PSC_Device_Failure_STM32
2014	PSC_Device_Failure_SOC_Driver
2015	PSC_Device_Failure_LED_Bar_Driver
2016	PSC_Device_Failure_PCA9547_I2C_Multiplexer

2017	PSC_Device_Failure_FRAM
2018	PSC_Device_Failure_PCA9537_IO_Expander_Batman
2019	PSC_Device_Failure_AMC6821_Fan_Ctrl_LBD
2020	PSC_Device_Failure_AMC6821_Fan_Ctrl_PSC
2021	PSC_Device_Failure_AMC6821_Fan_Ctrl_BATMAN
2022	PSC_Device_Failure_EEPROM_LBD
2023	PSC_Device_Failure_EEPROM_PC
2024	PSC_Device_Failure_EEPROM_BATMAN
2025	PSC_Device_Failure_PCA9554_IO_Expander_LBD
2026	PSC_XRS_CommunicationsError
2027	PSC_Fan_Temperature_Sensor_Failed
2028	PSC_Fan_Stalled
2029	PSC_Fan_Overspeed
2030	PSC_Temperature_Alert_High
2031	PSC_Software_Error
2032	PSC_Boost_Thermal_Failure
2033	PSC_Boost_Thermal_Failure_AC_Off
2034	PSC_Boost_Voltage_Failure
2035	PSC_Boost_System_Failure
2036	PSC_VBUS_VBAT_Mismatch
2037	PSC_System_VBUS_Low
2038	PSC_System_VBUS_Faulty
2039	PSC_VBAT_Critically_Low
2041	PSC_Major_SOC_Difference
2042	PSC_Aged_Batteries
2043	PSC_Charge_Partial
2044	PSC_Charge_Time_Exceeded
2045	PSC_Charge_Start_Failure
2046	PSC_Head_Power_Failure
2047	PSC_ATX_Fan_Failure
2048	PSC_ATX_DC_Failure
2049	PSC_Device_Failure_AMC6821_Fan_Ctrl_Tube
2050	PSC_Charge_Without_Input_Error
2051	PSC_POST_Failure_PCA9554_Batman
2052	PSC_Device_Failure_PCA9554_Batman
2053	PSC_Not_Enough_Batteries
2054	PSC_VBAT_Critically_High
2055	PSC_IBAT_Mismatch
2056	PSC_VBAT_Mismatch
2057	PSC_battery_high_temp

2058	PSC_battery_soh_variance
2059	XRS_Awaiting_Upgrade
2500	PSC_RDL_LinkAlert
2501	PSC_VoltageError_3v3
2502	PSC_VoltageError_5v
2503	PSC_VoltageError_24v
3000	FPDC_POST_Failure_STM32
3001	FPDC_POST_Failure_EEPROM
3002	FPDC_POST_Failure_LED_Bar_Driver
3003	FPDC_Device_Failure_STM32
3004	FPDC_Device_Failure_EEPROM
3005	FPDC_Device_Failure_LED_Bar_Driver
3006	FPDC_Device_Failure_Gas_Guage
3007	FPDC_Software_Error
3008	FPDC_Battery_Status_Overtemperature
3009	FPDC_Battery_Status_Overcharged
3010	FPDC_Battery_Status_Terminate_Charging
3011	FPDC_Battery_Cell_1_Voltage_Below_Threshold
3012	FPDC_Battery_Cell_2_Voltage_Below_Threshold
3013	FPDC_Battery_Cell_3_Voltage_Below_Threshold
3014	FPDC_Battery_Cell_4_Voltage_Below_Threshold
3015	FPDC_Battery_LMPV_Voltage_Below_Threshold
3016	FPDC_Battery_LMCV_Voltage_Below_Threshold
3500	FPDC_RDL_LinkAlert
3501	FPDC_VoltageError_3v3
3502	FPDC_VoltageError_5v
3503	FPDC_VoltageError_24v
4001	Cooper_Illegal_State
4002	Cooper_Boost_Supply_Stabilise_Fail
4003	Cooper_Focus_Supply_Stabilise_Fail_Voltage_Low
4004	Cooper_Focus_Supply_Stabilise_Fail_Voltage_High
4005	Cooper_Anode_Supply_Stabilise_Fail_Voltage_Low
4006	Cooper_Anode_Supply_Stabilise_Fail_Voltage_High
4007	Cooper_Focus_Supply_Voltage_Low
4008	Cooper_Focus_Supply_Voltage_High
4009	Cooper_Focus_Voltage_Ramp_Error
4010	Cooper_Focus_Current_Ramp_Error
4011	Cooper_Anode_Supply_Voltage_Low
4012	Cooper_Anode_Supply_Voltage_High
4013	Cooper_Anode_Voltage_Ramp_Error
4014	Cooper_Cathode_Voltage_Ramp_Error

4015	Cooper_Cathode_Current_Ramp_Error
4016	Cooper_Cathode_Demand_Error
4017	Cooper_Cathode_Current_Low
4018	Cooper_Cathode_Current_High
4019	Cooper_Anode_Current_Low_Error
4020	Cooper_Anode_Current_High_Error
4021	Cooper_Capacitor_Charge_Timeout
4022	Cooper_Capacitor_Health_Warning
4023	Cooper_Exposure_Timeout_Error
4024	Cooper_Mas_Integration_Fault
4025	Cooper_Load_Aborted_Warning
4026	Cooper_Anode_Arc_Fault
4027	Cooper_Anode_Over_Current_Fault
4028	Cooper_Anode_Over_Voltage_Fault
4029	Cooper_Charger_Over_Voltage_Fault
4030	Cooper_Focus_Over_Current_Fault
4031	Cooper_Focus_Over_Voltage_Fault
4032	Cooper_Boost_Over_Voltage_Fault
4033	Cooper_Cathode_Over_Current_Fault
4034	Cooper_Cathode_Over_Voltage_Fault
4035	Cooper_Ready_Uncharged_Cap
6000	InvalidState
6001	CancelledExposure
6002	PSCCommunicationsError
6003	PostExposureParametersMissing
6004	FPDCommunicationsError
6005	DAP_CommunicationsError
6006	DAP_DeviceFailure
6007	DAP_SyntaxError
6008	DAP_HV_Error
6009	DAP_ZeroCheckError
6010	DAP_EEPROM_Error
6011	SoftwareError
6012	CPU_FanStalled
6013	ServiceExposureDataAlert
6014	ServiceBatteryDataAlert
6015	ConfigurationError
6016	PSC_CriticalError
6017	FPD_CriticalError
6018	PSC_Shutdown
6019	COM_OverTemperature

6020	COM_UnderTemperature
6021	COM_FanOverspeed
6022	PSC_RecoveryFailed
6023	XRS_CriticalError
6024	FPDC_RecoveryFailed
6025	EEPROM_ConfigError
6026	XRS_CalibrationError
6027	XRS_Low_mA_Nonfire
6028	XRS_Focus_kV_present_during_standby_Nonfire
6029	XRS_Anode_mA_Overcurrent_Trip_Nonfire
6030	XRS_Anode_kV_Overvoltage_Trip_Nonfire
6031	XRS_Resonant_Current_Trip_Nonfire
6032	XRS_Grid_Fault_Nonfire
6033	XRS_Anode_Arc_Detect_Nonfire
6034	XRS_Tube_Focus_Fault_Nonfire
6035	XRS_mAs_Intergration_circuit_timeout_Nonfire
6036	XRS_Grid_over_Current_Fault_Nonfire
6037	XRS_Manually_terminated_exposure_Nonfire
6038	XRS_General_Nonfire
6039	XRS_Low_mA_Misfire
6040	XRS_Focus_kV_present_during_standby_Misfire
6041	XRS_Anode_mA_Overcurrent_Trip_Misfire
6042	XRS_Anode_kV_Overvoltage_Trip_Misfire
6043	XRS_Resonant_Current_Trip_Misfire
6044	XRS_Grid_Fault_Misfire
6045	XRS_Anode_Arc_Detect_Misfire
6046	XRS_Tube_Focus_Fault_Misfire
6047	XRS_mAs_Intergration_circuit_timeout_Misfire
6048	XRS_Grid_over_Current_Fault_Misfire
6049	XRS_Manually_terminated_exposure_Misfire
6050	XRS_General_Misfire
7000	PSC_POST_Failure_STM32
7001	PSC_POST_Failure_SOC_Controller
7002	PSC_POST_Failure_LED_Bar_Driver
7003	PSC_POST_Failure_PCA9547_I2C_Multiplexer
7004	PSC_POST_Failure_FRAM
7005	PSC_POST_Failure_PCA9537_IO_Expander
7006	PSC_POST_Failure_AMC6821_Fan_Controller_LBD
7007	PSC_POST_Failure_AMC6821_Fan_Ctrl_PC
7008	PSC_POST_Failure_AMC6821_Fan_Ctrl_BATMAN
7009	PSC_POST_Failure_EEPROM_LBD

7010	PSC_POST_Failure_EEPROM_PC
7011	PSC_POST_Failure_EEPROM_BATMAN
7012	PSC_POST_Failure_PCA9554_IO_Expander_LBD
7013	PSC_Device_Failure_STM32
7014	PSC_Device_Failure_SOC_Driver
7015	PSC_Device_Failure_LED_Bar_Driver
7016	PSC_Device_Failure_PCA9547_I2C_Multiplexer
7017	PSC_Device_Failure_FRAM
7018	PSC_Device_Failure_PCA9537_IO_Expander_Batman
7019	PSC_Device_Failure_AMC6821_Fan_Ctrl_LBD
7020	PSC_Device_Failure_AMC6821_Fan_Ctrl_PSC
7021	PSC_Device_Failure_AMC6821_Fan_Ctrl_BATMAN
7022	PSC_Device_Failure_EEPROM_LBD
7023	PSC_Device_Failure_EEPROM_PC
7024	PSC_Device_Failure_EEPROM_BATMAN
7025	PSC_Device_Failure_PCA9554_IO_Expander_LBD
7026	PSC_XRS_CommunicationsError
7027	PSC_Fan_Temperature_Sensor_Failed
7028	PSC_Fan_Stalled
7029	PSC_Fan_Overspeed
7030	PSC_Temperature_Alert_High
7031	PSC_Software_Error
7032	PSC_Boost_Thermal_Failure
7033	PSC_Boost_Thermal_Failure_AC_Off
7034	PSC_Boost_Voltage_Failure
7035	PSC_Boost_System_Failure
7036	PSC_VBUS_VBAT_Mismatch
7037	PSC_System_VBUS_Low
7038	PSC_System_VBUS_Faulty
7039	PSC_VBAT_Critically_Low
7041	PSC_Major_SOC_Difference
7042	PSC_Aged_Batteries
7043	PSC_Charge_Partial
7044	PSC_Charge_Time_Exceeded
7045	PSC_Charge_Start_Failure
7046	PSC_Head_Power_Failure
7047	PSC_ATX_Fan_Failure
7048	PSC_ATX_DC_Failure
7049	PSC_Device_Failure_AMC6821_Fan_Ctrl_Tube
7050	PSC_Charge_Without_Input_Error
7051	PSC_POST_Failure_PCA9554_Batman

7052	PSC_Device_Failure_PCA9554_Batman
7053	PSC_Not_Enough_Batteries
7054	PSC_VBAT_Critically_High
7055	PSC_IBAT_Mismatch
7056	PSC_VBAT_Mismatch
7057	PSC_battery_high_temp
7058	PSC_battery_soh_variance
7059	XRS_Awaiting_Upgrade
7500	PSC_RDL_LinkAlert
7501	PSC_VoltageError_3v3
7502	PSC_VoltageError_5v
7503	PSC_VoltageError_24v
8000	FPDC_POST_Failure_STM32
8001	FPDC_POST_Failure_EEPROM
8002	FPDC_POST_Failure_LED_Bar_Driver
8003	FPDC_Device_Failure_STM32
8004	FPDC_Device_Failure_EEPROM
8005	FPDC_Device_Failure_LED_Bar_Driver
8006	FPDC_Device_Failure_Gas_Guage
8007	FPDC_Software_Error
8008	FPDC_Battery_Status_Overtemperature
8009	FPDC_Battery_Status_Overcharged
8010	FPDC_Battery_Status_Terminate_Charging
8011	FPDC_Battery_Cell_1_Voltage_Below_Threshold
8012	FPDC_Battery_Cell_2_Voltage_Below_Threshold
8013	FPDC_Battery_Cell_3_Voltage_Below_Threshold
8014	FPDC_Battery_Cell_4_Voltage_Below_Threshold
8015	FPDC_Battery_LMPV_Voltage_Below_Threshold
8016	FPDC_Battery_LMCV_Voltage_Below_Threshold
8500	FPDC_RDL_LinkAlert
8501	FPDC_VoltageError_3v3
8502	FPDC_VoltageError_5v
8503	FPDC_VoltageError_24v
9001	Cooper_Illegal_State
9002	Cooper_Boost_Supply_Stabilise_Fail
9003	Cooper_Focus_Supply_Stabilise_Fail_Voltage_Low
9004	Cooper_Focus_Supply_Stabilise_Fail_Voltage_High
9005	Cooper_Anode_Supply_Stabilise_Fail_Voltage_Low
9006	Cooper_Anode_Supply_Stabilise_Fail_Voltage_High
9007	Cooper_Focus_Supply_Voltage_Low
9008	Cooper_Focus_Supply_Voltage_High

9009	Cooper_Focus_Voltage_Ramp_Error
9010	Cooper_Focus_Current_Ramp_Error
9011	Cooper_Anode_Supply_Voltage_Low
9012	Cooper_Anode_Supply_Voltage_High
9013	Cooper_Anode_Voltage_Ramp_Error
9014	Cooper_Cathode_Voltage_Ramp_Error
9015	Cooper_Cathode_Current_Ramp_Error
9016	Cooper_Cathode_Demand_Error
9017	Cooper_Cathode_Current_Low
9018	Cooper_Cathode_Current_High
9019	Cooper_Anode_Current_Low_Error
9020	Cooper_Anode_Current_High_Error
9021	Cooper_Capacitor_Charge_Timeout
9022	Cooper_Capacitor_Health_Warning
9023	Cooper_Exposure_Timeout_Error
9024	Cooper_Mas_Integration_Fault
9025	Cooper_Load_Aborted_Warning
9026	Cooper_Anode_Arc_Fault
9027	Cooper_Anode_Over_Current_Fault
9028	Cooper_Anode_Over_Voltage_Fault
9029	Cooper_Charger_Over_Voltage_Fault
9030	Cooper_Focus_Over_Current_Fault
9031	Cooper_Focus_Over_Voltage_Fault
9032	Cooper_Boost_Over_Voltage_Fault
9033	Cooper_Cathode_Over_Current_Fault
9034	Cooper_Cathode_Over_Voltage_Fault
9035	Cooper_Ready_Uncharged_Cap

#### Not-Ready-to-Shoot message

Code	Description
NR1	XRS Not Ready
NR2	Head Docked
NR3	PSU Not Ready
NR4	Battery Low
NR5	Tube Cooling
NR6	DAP Not Ready
NR7	Other
NR99	Disconnected

**Dose-Out-of-Determined-Range message**

Code	Description
Lim1	KV Lower
Lim2	KV Upper
Lim4	MAs Lower
Lim5	KV Lower and MAs Lower
Lim6	KV Upper and MAs Lower
Lim8	MAs Upper
Lim9	KV Lower and MAs Upper
Lim10	KV Upper and MAs Upper

## 8.5 Vieworks

This section explains the linkage between the VXvue and the Vieworks system model.

### Linkage Model

Vieworks

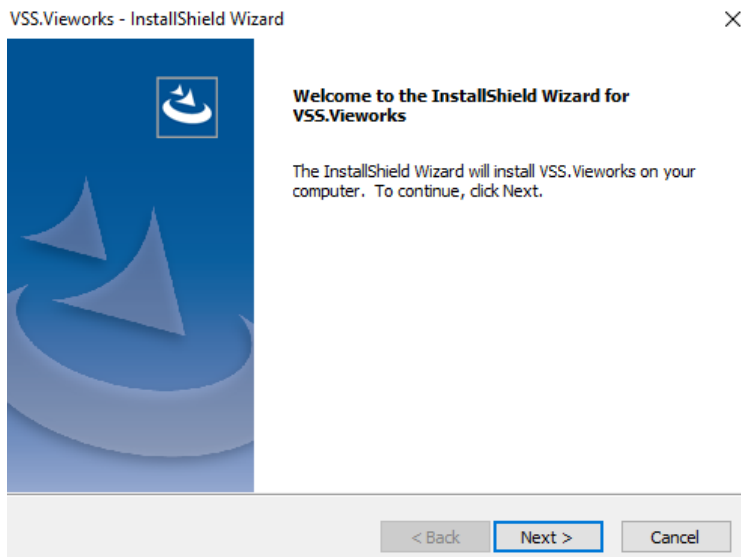
Mapped VXvue Version	System Firmware Ver.
V1.0.2.7	1.0.0.21T

### 8.5.1 Installing VSS

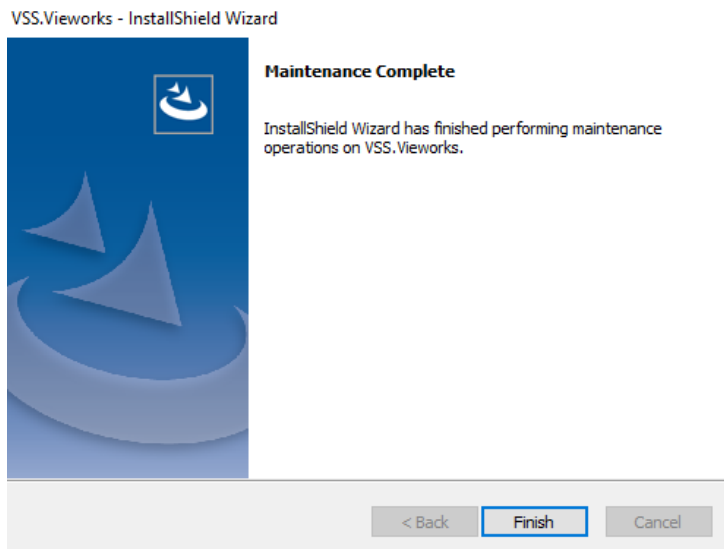


- You should install **VSS.Vieworks.Setup.exe** separately to use Vieworks system. Contact the person in charge of Vieworks if you need to install the file.

- 1 Install **VXvue**.
- 2 Execute VSS.Vieworks.Setup.exe file as an administrator mode.
- 3 Click the **Install** button to start installing the file.



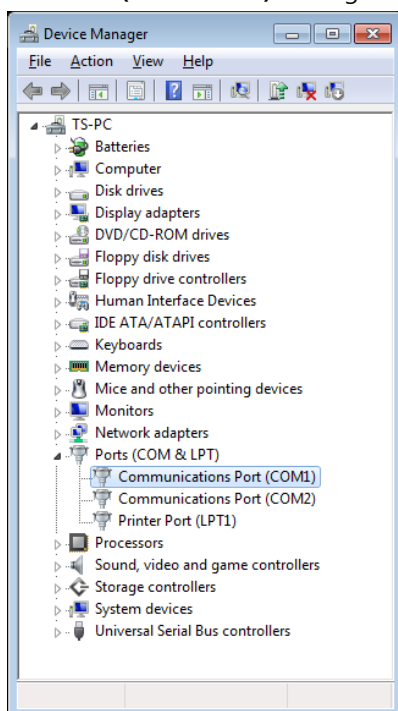
- 4 Click the **Finish** button to complete installation.



- 5 Check if '[Database of VXvue]\Integration\VSS.Viewworks' folder and the sub files are installed successfully.
  - Ex) D:\Database\Integration\VSS.Viewworks\

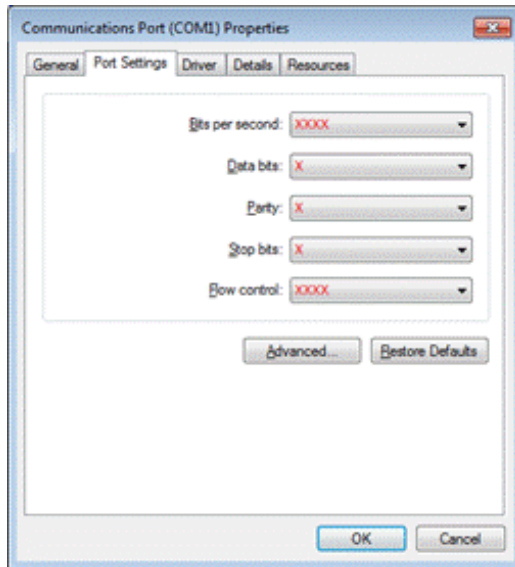
## 8.5.2 How to Set Port from PC

- 1 Run **Device Manager** by selecting one of the two steps as follows.
  - Control Panel → System and Security → Select System → Device Manager
  - Start → Input Device Manager to Windows Search
- 2 Select **Ports (COM & LPT)** and right-Click the **Communications Port** menu. Then choose **Properties**.

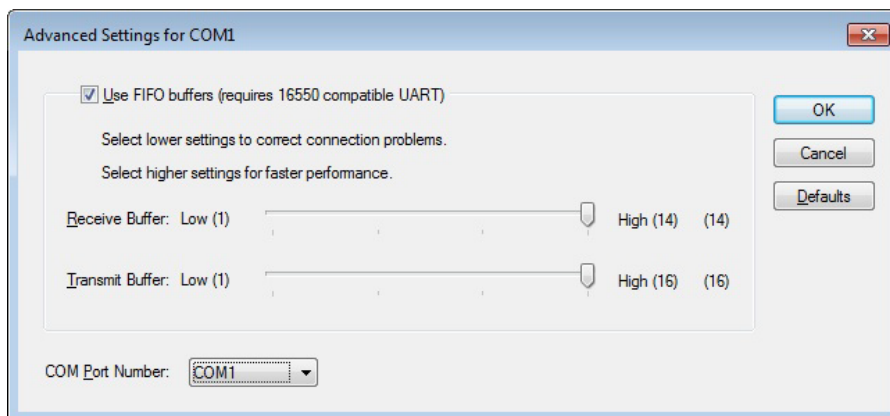


3 Click the **Port** Settings tab and set each menu as follows. Then click the **Advanced** tab.

- RFXPolydorusHigh
  - Bit per second: **19200** / Data bits: **8** / Parity: **None** / Stop bits: **2** / Flow control: **None**
- NingBoEmgCrs
  - Bit per second: **19200** / Data bits: **8** / Parity: **None** / Stop bits: **1** / Flow control: **None**



4 If you need to change the port number, specify the COM Port Number and click the OK button.

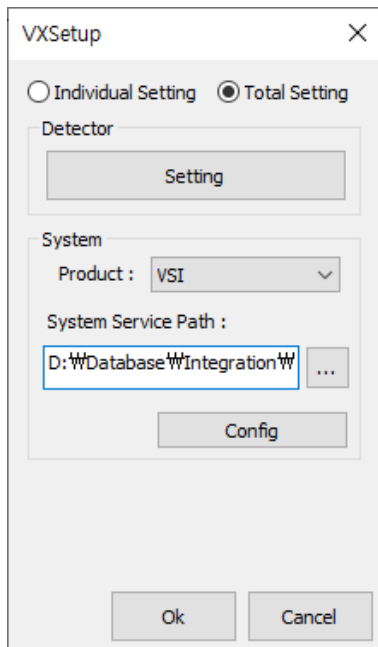


- Input or choose the configured COM port number when you set system in VXSetup.

### 8.5.3 How to Set VSS in VXSetup

#### VXSetup

- 5 Run **VXSetup** and click the **Total Setting** button.



- 6 Choose 'VSI' in the Product menu of **System**.
- 7 Set the System Service Path to [VXvue Database]\Integration\VSS.GR10X\VSS.Viewworks.exe.
  - Ex) D:\Database\Integration\VSS.GR10X\VSS.Viewworks.exe
- 8 Click the **Config** button to run the equipment setting mode of the system service.
- 9 When the system service equipment setting window is displayed, click the **Ok** button to finish.

## 8.5.4 Setting System Device in VXSetup and VXvue

### VXSetup (System Configuration Tool)

System Configuration Tool

Generator  
Model: VirtualGenerator

DAP  
Model: None

Display  
Model: None

Save Close

### Generator

#### ▫ RFXPolydorosHigh (Siemens)

- 1 Choose **RFXPolydorosHigh** in Generator window.

Generator

Model: RFXPolydorosHigh Serial Port Number: COM3 Echo Details

Condition mode

Dose Settings

kVp

Minimum: 40 Maximum: 150

mA

10
11
12.5
14
16
18
20
22
25
28

ms

1
1.1
1.25
1.4
1.6
1.8
2
2.2
2.5
2.8

mAs

0.5
0.56
0.63
0.71
0.8
0.9
1
1.1
1.25
1.4

- 2 Set the Serial Port number for integration and click the Echo button for connection test.
  - If connected normally, a 'Connection Success' message appears.
  - If connection fails, a 'Connection Failed' message appears.
- 3 You can check the Dose parameter settings in the Dose Settings section of the Condition mode window.
  - Depending on the tube model used, the KV range can be set.
  - You can edit the range and value of mA, ms, and mAs values according to the tube model you are using.

### ▣ NingboEmgCrs (EST)

1 Select the NingBoEmgCrs model in the Generator window.

Generator

Model: NingBoEmgCrs

Serial Port Number: COM3

Stop Bit: 1

Mode With: Console

Exposure Sound: ☐

Error Sound: ☐

Details ^

Condition mode

Dose Settings

kVp

Minimum: 40

Maximum: 150

mA	ms	mAs
10	1	0.5
12.5	1.25	0.63
16	1.6	0.8
20	2	1
25	2.5	1.25
32	3.2	1.6
40	4	2
50	5	2.5
63	6.3	3.2
80	8	4

2 After setting the serial port number and stop bit used for interworking, click the Echo button to test the connection.

- In case of normal connection, 'Connection Success' message appears.
- If connection fails, 'Connection Failed' message appears.

3 Set whether to use Console (membrane) or Mini Box (Mini Console) in Mode With.

4 Use the Exposure Sound checkbox to set whether to generate sound during exposure.

5 Set whether to generate a sound when an error occurs through the Error Sound checkbox.


6 You can check the Dose parameter settings in the Dose Settings section of the Condition mode window.

- Depending on the tube model used, the KV range can be set.
- You can edit the range and value of mA, ms, and mAs values according to the tube model you are using.

## DAP

### ▫ Integrated

- 1 Select the Integrated model in the DAP window.



The screenshot shows a window titled 'DAP'. Inside, there is a label 'Model' followed by a dropdown menu. The dropdown menu is open, and the word 'Integrated' is selected and highlighted.

- 2 When the corresponding model is selected, indirect interlocking method through Generator is used.

### ▫ VacuDAP

- 1 Select one of the VacuDap models in the DAP window.
  - VacuDAP OEM (Chamber, Part No. 156 00 15, 158 00 15)
  - VacuDAP Standard (Display Unit, Part No. 949 00 01, 943 00 04/05)
  - VacuDAP Bluetooth OEM (Chamber, Part No. 156 00 14, 158 00 14)
  - VacuDAP Bluetooth (Display Unit, Part No. 943 00 06)



The screenshot shows a window titled 'DAP'. Inside, there are two labels: 'Model' and 'Serial Port Number'. The 'Model' dropdown menu is set to 'VacuDAP OEM'. The 'Serial Port Number' dropdown menu is set to 'COM3'. There is also an 'Echo' button next to the 'Serial Port Number' dropdown.

- 2 After setting the serial port number used for linking, click the Echo button to test the connection.
  - In case of normal connection, 'Connection Success' message appears.
  - If connection fails, 'Connection Failed' message appears.



- For details on DAP interworking conditions, please refer to the chapter 6.3 in this document.

## Display

### ▫ Integrated

- 1 Select the Integrated model in the Display window.



The screenshot shows a window titled 'Display'. Inside, there is a label 'Model' followed by a dropdown menu. The dropdown menu is open, and the word 'Integrated' is selected and highlighted.

- 2 When the corresponding model is selected, indirect interlocking method through Generator is used.



- The indirect interlocking method means that the display is connected to the generator and VXvue communicates with the display through the generator.

## ESTDisplay

- 1 Select the ESTDisplay model in the Display window.

Display

Model ESTDisplay

Client(Display)

Client IP 192.168.150.6

Client Port 22

Client ID root

Client Password 123456

Server(VSS)

Server IP 192.168.150.2

Server Port 19999

Server ID Server

Server Password 1234

Patient Size

Client	VXvue
Children	PEDIATRIC
Thin	SMALL
Normal	MEDIUM
Fat	LARGE

Bucky

Client	VXvue
Stand	Stand
Table	Table
CR	NoBuckyDR

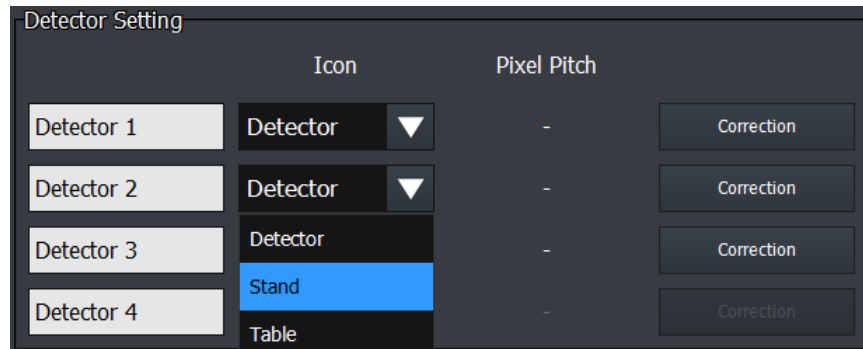
- 2 Set the communication between Client and Server to interwork with EST Display Client equipment.
  - Enter IP and Port information for data communication.
  - Enter the ID and password to access the device.
- 3 In the Patient Size group, the patient size information displayed on the Client (Display) and the patient size displayed on VXvue You can configure settings to synchronize information with each other.
- 4 In the Bucky group, the Bucky information displayed in the Client (Display) and the Bucky information displayed in VXvue are mutually You can configure synchronization settings.










- VXvue and Display Client exchange data using TCP communication.
- Contact the display manufacturer for Client ID and Client Password.

**VXvue**

- 1 Go to **VXvue**의 **Setting** mode > **Integration** > **Detector** panel to change the Icon, displayed on Bucky, to use in each detector.

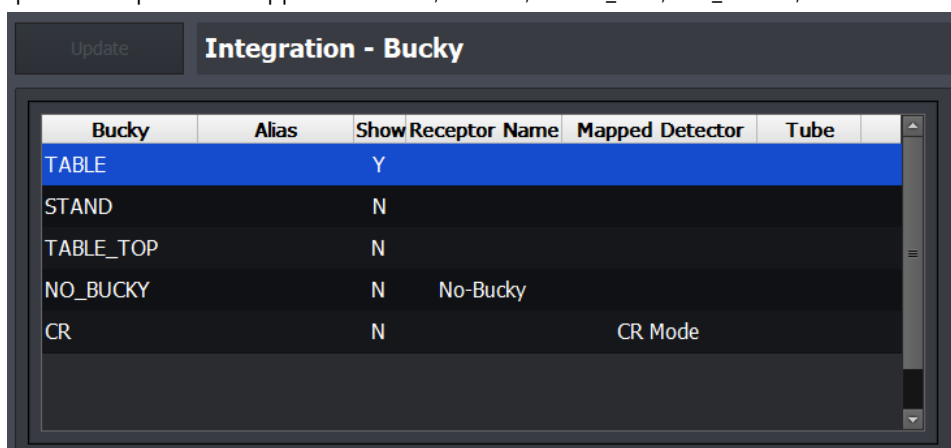


- The corresponding icon changes in **VXvue** according to the option you select.

Icon	Option
  	Detector
	Stand
	Table
	Table Top
	No Bucky

- 2 Go to Setting mode > Integration > Bucky panel to map detector by each receptor as follows:

- Up to 5 receptors are supported: TABLE, STAND, TABLE\_TOP, NO\_BUCKY, and CR.

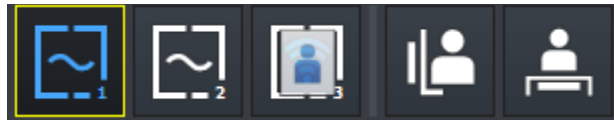




- You can map only one detector with one bucky.
- You can map the identical receptor name on multiple buckies.
- You can configure Tube and AEC Chamber Mapping by each bucky.
- A user can configure a desired alias in the column of Alias for each Bucky.
- If one detector maps multiple buckies, the very first mapped-bucky is automatically selected.



- CR Bucky can only map CR Detector.



- Set Show item to Y to display on the VXvue – Exposure screen.
- Once you configure the receptor, **Stand/Table/Table Top/No Bucky** icons are added to the **Detector** icon on VXvue-Exposure mode.
- When selecting the **Receptor** icon, the configure Receptor and the detector mapped to the receptor are automatically set.

### 8.5.5 How to Set System in Procedure Manager of VXvue

- Click the **Procedure Manager** button from Setting mode → Procedure → Procedure Manager panel in **VXvue**. Or, execute **Procedure Manager** located in the installation folder of **VXvue** directly.
- To automatically configure the system values when selecting Step on Exposure mode, you should input all the system values to use.



- Before Procedure manager execution, run the VSS Configuration tool first for system setting.
- The configured values in VSS Configured tool is reflected on Procedure manager.



- For more information on VSS Configuration tool setting, refer to <8.5.4Setting System Device in VXSetup and VXvue>.

### When Configured to Condition Mode in VSS Configuration tool

- Set all the system values(Dose Mode / kVp / mAs / mA / ms) to use in all Step.
- Predetermine the system configuration tool, and the changes made in the configuration tool are applied to the procedure manager.

Procedure Manager

Category

Procedure

Stitch Protocol

Step

Bodypart/Projection

Show All

General

Generator

Collimator

Equipment

Search

Setting

Target E.I.

Patient Size

Select All

Copy From

Insert

Edit

Delete

Name	Patient...	Dose Mode	kVp	mAs	mA	ms	AEC Left	AEC Center	AEC Right	AEC Density	AEC Film Speed
Abdomen Erect	Large	Current	52	5	100	50	N	N	N	0	Current
Abdomen Erect	Medium	mA/ms	60	5	50	100	N	N	N	0	Current
Abdomen Erect	Small	Current	52	5	100	50	N	N	N	0	Current
Abdomen Erect	Pediatric	Current	52	5	100	50	N	N	N	0	Current
Abdomen KUB	Large	Current	52	5	100	50	N	N	N	0	Current
Abdomen KUB	Medium	mAs	70	14	100	140	N	N	N	0	Current
Abdomen KUB	Small	Current	52	5	100	50	N	N	N	0	Current
Abdomen KUB	Pediatric	Current	52	5	100	50	N	N	N	0	Current
Abdomen Supine	Large	Current	52	5	100	50	N	N	N	0	Current
Abdomen Supine	Medium	Current	56	5	100	50	N	Y	N	2	200
Abdomen Supine	Small	Current	52	5	100	50	N	N	N	0	Current
Abdomen Supine	Pediatric	Current	52	5	100	50	N	N	N	0	Current



- If only 'Generator' is selected among the buttons at the top of the Step tab, only the generator-related settings are displayed.
- You cannot set the value of the function that the generator does not support.
- If you select a value other than Current in **Dose mode**, it automatically switches to the configured Dose mode when Step was selected.
- The output of values in the **AEC Left / Center / Right, AEC Density, AEC Film Speed** columns is determined using **AEC**.

### 8.5.6 How to Use CPI Generator in VXvue

The following UIs (User Interface) are displayed on the **Exposure** mode of **VXvue** after setting **VXSetup**.

- Click ▲ or ▼ button to adjust the X-ray condition.









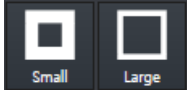


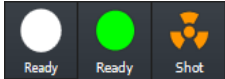
- Check the following status if generator control UI is not indicated.
  - Check if the power of generator is turned on.
  - Check if the cable between the generator and PC is connected normally.
  - Check communication status between the generator and PC. (Ex. port settings, etc.)

- You can perform the following functions.
  - Using AEC function
  - Adjusting kVp and mAs
  - Adjusting mA and ms instead of mAs

Items	Image			
2 points	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼
3 points	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼
AEC (Backup mode : mAs)	70	kVp ▲ ▼	20	mAs ▲ ▼
	200	mA ▲ ▼	100	ms ▲ ▼

## Icons

The icons disabled in UI are not supported ones when the viewer is integrated with Viewworks system.

Icon	Name	Description
	mAs	Enable to use 2 points mode where <b>kVp</b> and <b>mAs</b> can be adjusted.
	mA/ms	Enable to use 3 points mode where <b>kVp</b> , <b>mA</b> , <b>ms</b> can be adjusted.
	AEC	Enable to apply AEC functions.
	AEC Field (Left / Center / Right)	Select an AEC field to use. <ul style="list-style-type: none"> <li>• Default setting: Center</li> <li>• Enable to select multiple AEC fields.</li> </ul>
	Density	Enable to adjust the density of AEC.
	Film / Screen	Enable to set film and screen (Sensitivity) of AEC. <ul style="list-style-type: none"> <li>▪ 100, 200, 400, 800</li> </ul>
	Focal Spot Size (Small / Large)	Focal Spot Size is changed automatically depending on the mA setting of generator, or the user can change it manually.
	Reset	The <b>Reset</b> icon is activated, and an error message is indicated when a soluble error occurs by resetting the system. Click the icon at this time to start reset.
	Heat Units (Anode)	The color of icon changes according to the heat units. <ul style="list-style-type: none"> <li>• 0&lt;HU≤50: Green</li> <li>• 50&lt;HU≤80: Yellow</li> <li>• 80&lt;HU: Red</li> </ul>
	X-ray Status	The icons and their color are changed depending on the status of generator.

- **Ready** (White) - Standby
- **Ready** (Green) – Completing preparation of X-ray exposure after pressing the 1<sup>st</sup> level switch (Ready) of the generator.
- **Shot** (Yellow) – Exposing X-ray by pressing the 2<sup>nd</sup> level switch (Exposure) of the generator.



- Refer to **VXvue Operation Manual** and **VXvue Service Manual** for the detailed information about using **VXvue**.

### 8.5.7 Error and Warning Messages

Common error and warning messages are displayed in a slide-out format.

- Red indicates an error and yellow indicates a warning.
- Information on VXvue error and warning.



- Contact the manufacturer of generator if error or warning messages keep displaying even though you click the **Reset** button or reboot the generator.

- Recoverable error: Reset button is activated. Click the Reset button to fix the problem.
- Unrecoverable error: Close VXvue, fix the system problem, and then reboot.
- **Error and warning messages can be checked through the lower 4 digits of the Error Code displayed in VXvue and the matching error code in the table below.**

#### Error Message

- **RFXPolydorosHigh**

Code	Error Message
0000	The submodule MRC1 has exceeded the intermediate circuit voltage minimum threshold. V_DCL mi out of range
0001	The submodule MRC1 has exceeded the intermediate circuit voltage minimum threshold. V_DCL min
0002	The submodule MRC1 has exceeded the intermediate circuit voltage minimum threshold. V_DCL min
0003	V_DCL normal
0004	The submodule MRC1 has exceeded the intermediate circuit voltage maximum threshold. V_DCL max

0005	The submodule MRC1 has exceeded the intermediate circuit voltage maximum threshold. V_DCL max
0006	The submodule MRC1 has exceeded the intermediate circuit voltage maximum threshold. V_DCL max out of range
0007	V_DCL cyclic information
0008	V_DCL difference exceeded
0009	The submodule GCB has exceeded the 24 V minimum threshold. GCB 24 V mi out of range
0010	The submodule GCB has exceeded the 24 V minimum threshold. GCB 24 V mi
0011	The submodule GCB has exceeded the 24 V minimum threshold. GCB 24 V min
0012	MON_ADC_V24P_Normal
0013	The submodule GCB has exceeded the 24 V maximum threshold. GCB 24 V max
0014	The submodule GCB has exceeded the 24 V maximum threshold. GCB 24 V max
0015	The submodule GCB has exceeded the 24 V maximum threshold. GCB 24 V max out of range
0016	MON_ADC_V24P_Cyclic
0017	MON_ADC_V24P_Differ
0018	The submodule GCB has exceeded the +15 V maximum threshold. GCB 15 V min out of range
0019	The submodule GCB has exceeded the +15 V maximum threshold. GCB 15 V min
0020	The submodule GCB has exceeded the +15 V maximum threshold. GCB 15 V min
0021	MON_ADC_V15P0_Normal
0022	The submodule GCB has exceeded the +15 V maximum threshold. GCB 15 V max
0023	The submodule GCB has exceeded the +15 V maximum threshold. GCB 15 V max
0024	The submodule GCB has exceeded the +15 V maximum threshold. GCB 15 V max out of range
0025	GCB 15 V max out of range
0026	MON_ADC_V15P0_Cyclic
0027	The submodule GCB has exceeded the -15 V minimum threshold. GCB -15 V min out of range
0028	The submodule GCB has exceeded the -15 V minimum threshold. GCB -15 V min
0029	The submodule GCB has exceeded the -15 V minimum threshold. GCB -15 V min
0030	MON_ADC_V15N0_Normal
0031	The submodule GCB has exceeded the -15 V minimum threshold. GCB -15 V max
0032	The submodule GCB has exceeded the -15 V minimum threshold. GCB -15 V max
0033	The submodule GCB has exceeded the -15 V minimum threshold. GCB -15 V max out of range
0034	MON_ADC_V15N0_Cyclic
0035	MON_ADC_V15N0_Differ
0036	The submodule GCB has exceeded the -15 V minimum threshold. GCB 5 V min out of range

0037	The submodule GCB has exceeded the-15 V minimum threshold. GCB 5 V min
0038	The submodule GCB has exceeded the-15 V minimum threshold. GCB 5 V min
0039	MON_ADC_V5P0_Normal
0040	The submodule GCB has exceeded the-15 V minimum threshold. GCB 5 V max
0041	The submodule GCB has exceeded the-15 V minimum threshold. GCB 5 V max
0042	The submodule GCB has exceeded the-15 V minimum threshold. GCB 5 V max out of range
0043	MON_ADC_V5P0_Cyclic
0044	MON_ADC_V5P0_Differ
0045	The submodule GCB has exceeded the3.3 V minimum threshold. GCB 3.3 V min out of range
0046	The submodule GCB has exceeded the3.3 V minimum threshold. GCB 3.3 V min
0047	The submodule GCB has exceeded the3.3 V minimum threshold. GCB 3.3 V min
0048	MON_ADC_V3P3_Normal
0049	The submodule GCB has exceeded the3.3 V minimum threshold. GCB 3.3 V max
0050	The submodule GCB has exceeded the3.3 V minimum threshold. GCB 3.3 V max
0051	The submodule GCB has exceeded the3.3 V minimum threshold. GCB 3.3 V max out of range
0052	MON_ADC_V3P3_Cyclic
0053	MON_ADC_V3P3_Differ
0054	The submodule GCB has exceeded the2.5 V minimum threshold. GCB 2.5 V min out of range
0055	The submodule GCB has exceeded the2.5 V minimum threshold. GCB 2.5 V min
0056	The submodule GCB has exceeded the2.5 V minimum threshold. GCB 2.5 V min
0057	MON_ADC_V2P5_Normal
0058	The submodule GCB has exceeded the2.5 V maximum threshold. GCB 2.5 V max
0059	The submodule GCB has exceeded the2.5 V maximum threshold. GCB 2.5 V max
0060	The submodule GCB has exceeded the2.5 V maximum threshold. GCB 2.5 V max out of range
0061	MON_ADC_V2P5_Cyclic
0062	MON_ADC_V2P5_Differ
0063	The submodule GCB has exceeded the1.5 V minimum threshold. GCB 1.5 V min out of range
0064	The submodule GCB has exceeded the1.5 V minimum threshold. GCB 1.5 V min
0065	The submodule GCB has exceeded the1.5 V minimum threshold. GCB 1.5 V min
0066	MON_ADC_V1P5_Normal
0067	The submodule GCB has exceeded the1.5 V maximum threshold. GCB 1.5 V max
0068	The submodule GCB has exceeded the1.5 V maximum threshold. GCB 1.5 V max
0069	The submodule GCB has exceeded the1.5 V maximum threshold. GCB 1.5 V max out of range

0070	MON_ADC_V1P5_Cyclic
0071	MON_ADC_V1P5_Differ
0072	The submodule GCB has exceeded the 1.1 V minimum threshold. GCB 1.1 V min out of range
0073	The submodule GCB has exceeded the 1.1 V minimum threshold. GCB 1.1 V min
0074	The submodule GCB has exceeded the 1.1 V minimum threshold. GCB 1.1 V min
0075	MON_ADC_V1P1_Normal
0076	The submodule GCB has exceeded the 1.1 V maximum threshold. GCB 1.1 V max
0077	The submodule GCB has exceeded the 1.1 V maximum threshold. GCB 1.1 V max
0078	The submodule GCB has exceeded the 1.1 V maximum threshold. GCB 1.1 V max out of range
0079	MON_ADC_V1P1_Cyclic
0080	MON_ADC_V1P1_Diff
0081	The submodule HVT has a broken temperature sensor. HVT temperature min out of range
0082	The submodule HVT has a broken temperature sensor. HVT temperature min
0083	n.a. MON_HVT_Temp_LowWarning
0084	MON_HVT_Temp_Normal
0085	The submodule HVT has exceeded temperature of 60 °C. HVT temperature max
0086	The submodule HVT has exceeded temperature of 70 °C. HVT temperature max
0087	The submodule HVT has an broken temp sensorn HVT temperature max out of range
0088	MON_HVT_Temp_Cyclic
0089	MON_HVT_Temp_Differ
0090	MON_XTM_Temp1_LowOOR
0091	MON_XTM_Temp1_LowError
0092	MON_XTM_Temp1_LowWarning
0093	MON_XTM_Temp1_Normal
0094	MON_XTM_Temp1_HighWarning
0095	MON_XTM_Temp1_HighError
0096	MON_XTM_Temp1_HighOOR
0097	MON_XTM_Temp1_Cyclic
0098	MON_XTM_Temp1_Differ
0099	MON_XTM_Temp2_LowOOR
0100	MON_XTM_Temp2_LowError
0101	MON_XTM_Temp2_LowWarning
0102	MON_XTM_Temp2_Normal
0103	MON_XTM_Temp2_HighWarning
0104	MON_XTM_Temp2_HighError
0105	MON_XTM_Temp2_HighOOR

0106	MON_XTM_Temp2_Cyclic
0107	MON_XTM_Temp2_Differ
0108	MON_C03_LowOOR
0109	MON_C03_LowError
0110	MON_C03_LowWarning
0111	MON_C03_Normal
0112	MON_C03_HighWarning
0113	MON_C03_HighError
0114	MON_C03_HighOOR
0115	MON_C03_Cyclic
0116	MON_C03_Differ
0117	The submodule RFM (FIL) has a broken temperature sensor. FIL temperature min out of range
0118	The submodule RFM (FIL) has a broken temperature sensor. FIL temperature min
0119	MON_FIL_TEMP_LowWarning
0120	MON_FIL_TEMP_Normal
0121	The submodule RFM (FIL) has exceeded temperature of 60 °C. FIL temperature max
0122	The submodule RFM (FIL) has exceeded temperature of 70 °C. FIL temperature max
0123	The submodule RFM (FIL) has an broken temp sensorn FIL temperature max out of range
0124	MON_FIL_TEMP_Cyclic
0125	MON_FIL_TEMP_Differ
0126	The submodule RFM (RAC) has a broken temperature sensor. RAC temperature min out of range
0127	The submodule RFM (RAC) has a broken temperature sensor. RAC temperature min
0128	MON_RAC_TEMP_LowWarning
0129	MON_RAC_TEMP_Normal
0130	The submodule RFM (RAC) has exceeded temperature of 60 °C. RAC temperature max
0131	The submodule RFM (RAC) has exceeded temperature of 70 °C. RAC temperature max
0132	The submodule RFM (RAC) has an broken temp sensorn RAC temperature max out of range
0133	MON_RAC_TEMP_Cyclic
0134	MON_RAC_TEMP_Differ
0135	The submodule RCE has a broken temperature sensor. RCE1 temperature min out of range
0136	The submodule RCE has a broken temperature sensor. RCE1 temperature min
0137	MON_INV1_IND_TEMP_LowWarning
0138	MON_INV1_IND_TEMP_Normal
0139	The submodule RCE has exceeded temperature of 60 °C. RCE1 temperature max
0140	The submodule RCE has exceeded temperature of 70 °C. RCE1 temperature max
0141	The submodule RCE has an broken tempsensor. RCE1 temperature max out of range

0142	MON_INV1_IND_TEMP_Cyclic
0143	MON_INV1_IND_TEMP_Differ
0144	The submodule INV1 (HS1) has a broken temperature sensor. INV1_HS1 temperature min out of range
0145	The submodule INV1 (HS1) has a broken temperature sensor. INV1_HS1 temperature min
0146	MON_INV1_HS1_TEMP_LowWarning
0147	MON_INV1_HS1_TEMP_Normal
0148	The submodule INV1 (HS1) has exceeded temperature of 60 °C. INV1_HS1 temperature max
0149	The submodule INV1 (HS1) has exceeded temperature of 70 °C. INV1_HS1 temperature max
0150	The submodule INV1 (HS1) has an broken temp sensor. INV1_HS1 temperature max out of range
0151	MON_INV1_HS1_TEMP_Cyclic
0152	MON_INV1_HS1_TEMP_Differ
0153	The submodule INV1 (HS2) has a broken temperature sensor. INV1_HS2 temperature min out of range
0154	The submodule INV1 (HS2) has a broken temperature sensor. INV1_HS2 temperature min
0155	MON_INV1_HS2_TEMP_LowWarning
0156	MON_INV1_HS2_TEMP_Normal
0157	The submodule INV1 (HS2) has exceeded temperature of 60 °C. INV1_HS2 temperature max
0158	The submodule INV1 (HS2) has exceeded temperature of 70 °C. INV1_HS2 temperature max
0159	The submodule INV1 (HS2) has an broken temp sensor. INV1_HS2 temperature max out of range
0160	MON_INV1_HS2_TEMP_Cyclic
0161	MON_INV1_HS2_TEMP_Differ
0162	The submodule RCE has a broken temperature sensor. RCE2 temperature min out of range
0163	The submodule RCE has a broken temperature sensor. RCE2 temperature min
0164	MON_INV2_IND_TEMP_LowWarning
0165	MON_INV2_IND_TEMP_Normal
0166	The submodule RCE has exceeded temperature of 60 °C. RCE2 temperature max
0167	The submodule RCE has exceeded temperature of 70 °C. RCE2 temperature max
0168	The submodule RCE has an broken tempsensor. RCE2 temperature max out of range
0169	MON_INV2_IND_TEMP_Cyclic
0170	MON_INV2_IND_TEMP_Differ
0171	The submodule INV1 (HS1) has a broken temperature sensor. INV2_HS1 temperature min out of range

0172	The submodule INV1 (HS1) has a broken temperature sensor. INV2_HS1 temperature min
0173	MON_INV2_HS1_TEMP_LowWarning
0174	MON_INV2_HS1_TEMP_Normal
0175	The submodule INV2 (HS1) has exceeded temperature of 60 °C. INV2_HS1 temperature max
0176	The submodule INV2 (HS1) has exceeded temperature of 70 °C. INV2_HS1 temperature max
0177	The submodule INV2 (HS1) has an broken temp sensor. INV2_HS1 temperature max out ofrange
0178	MON_INV2_HS1_TEMP_Cyclic
0179	MON_INV2_HS1_TEMP_Differ
0180	The submodule INV2 (HS2) has a broken temperature sensor. INV2_HS2 temperature min out ofrange
0181	The submodule INV2 (HS2) has a broken temperature sensor. INV2_HS2 temperature min
0182	MON_INV2_HS2_TEMP_LowWarning
0183	MON_INV2_HS2_TEMP_Normal
0184	The submodule INV2 (HS2) has exceeded temperature of 60 °C. INV2_HS2 temperature max
0185	The submodule INV2 (HS2) has exceeded temperature of 70 °C. INV2_HS2 temperature max
0186	The submodule INV2 (HS2) has an broken temp sensor. INV2_HS2 temperature max out ofrange
0187	MON_INV2_HS2_TEMP_Cyclic
0188	MON_INV2_HS2_TEMP_Differ
0189	The submodule MRC1 has a broken temperature sensor. MRC1 temperature min out of range
0190	The submodule MRC1 has a broken temperature sensor. MRC1 temperature min
0191	MON_MRC1_TEMP_LowWarning
0192	MON_MRC1_TEMP_Normal
0193	The submodule MRC1 has exceeded temperature of 60 °C. MRC1 temperature max
0194	The submodule MRC1 has exceeded temperature of 70 °C. MRC1 temperature max
0195	The submodule MRC1 has an broken temp sensor. MRC1 temperature max out of range
0196	MON_MRC1_TEMP_Cyclic
0197	MON_MRC1_TEMP_Differ
0198	The submodule MRC2 has a broken temperature sensor. MRC2 temperature min out of range
0199	The submodule MRC2 has a broken temperature sensor. MRC2 temperature min
0200	MON_MRC2_TEMP_LowWarning
0201	MON_MRC2_TEMP_Normal

<b>0202</b>	The submodule MRC2 has exceeded temperature of 60 °C. MRC2 temperature max
<b>0203</b>	The submodule MRC2 has exceeded temperature of 70 °C. MRC2 temperature max
<b>0204</b>	The submodule MRC2 has an broken temp sensor. MRC2 temperature max out of range
<b>0205</b>	MON_MRC2_TEMP_Cyclic
<b>0206</b>	MON_MRC2_TEMP_Differ
<b>0207</b>	The submodule RFM has exceeded the 5V minimum threshold. RFM 5 V min out of range
<b>0208</b>	The submodule RFM has exceeded the 5V minimum threshold. RFM 5 V min
<b>0209</b>	The submodule RFM has exceeded the 5V minimum threshold. RFM 5 V min
<b>0210</b>	MON_RFM_V5P_Normal
<b>0211</b>	The submodule RFM has exceeded the 5V maximum threshold. RFM 5 V max
<b>0212</b>	The submodule RFM has exceeded the 5V maximum threshold. RFM 5 V max
<b>0213</b>	The submodule RFM has exceeded the 5V maximum threshold. RFM 5 V max out of range
<b>0214</b>	MON_RFM_V5P_Cyclic
<b>0215</b>	MON_RFM_V5P_Differ
<b>0216</b>	The submodule RFM has exceeded the 24 V minimum threshold. RFM 24 V min out of range
<b>0217</b>	The submodule RFM has exceeded the 24 V minimum threshold. RFM 24 V min
<b>0218</b>	The submodule RFM has exceeded the 24 V minimum threshold. RFM 24 V min
<b>0219</b>	MON_RFM_V24P_Normal
<b>0220</b>	The submodule RFM has exceeded the 24 V maximum threshold. RFM 24 V max
<b>0221</b>	The submodule RFM has exceeded the 24 V maximum threshold. RFM 24 V max
<b>0222</b>	The submodule RFM has exceeded the 24 V maximum threshold. RFM 24 V max out of range
<b>0223</b>	MON_RFM_V24P_Cyclic
<b>0224</b>	MON_RFM_V24P_Differ
<b>0225</b>	The submodule INV1 has exceeded the 5 V minimum threshold. INV1 5 V min out of range
<b>0226</b>	The submodule INV1 has exceeded the 5 V minimum threshold. INV1 5 V min
<b>0227</b>	The submodule INV1 has exceeded the 5 V minimum threshold. INV1 5 V min
<b>0228</b>	MON_INV1_V5P_Normal
<b>0229</b>	The submodule INV1 has exceeded the 5 V maximum threshold. INV1 5 V max
<b>0230</b>	The submodule INV1 has exceeded the 5 V maximum threshold. INV1 5 V max
<b>0231</b>	The submodule INV1 has exceeded the 5 V maximum threshold. INV1 5 V max out of range
<b>0232</b>	MON_INV1_V5P_Cyclic
<b>0233</b>	MON_INV1_V5P_Differ
<b>0234</b>	The submodule INV1 has exceeded the 24 V minimum threshold. INV1 24 V min out of range
<b>0235</b>	The submodule INV1 has exceeded the 24 V minimum threshold. INV1 24 V min
<b>0236</b>	The submodule INV1 has exceeded the 24 V minimum threshold. INV1 24 V min
<b>0237</b>	MON_INV1_V24P_Normal

<b>0238</b>	The submodule INV1 has exceeded the 24 V maximum threshold. INV1 24 V max
<b>0239</b>	The submodule INV1 has exceeded the 24 V maximum threshold. INV1 24 V max
<b>0240</b>	The submodule INV1 has exceeded the 24 V maximum threshold. INV1 24 V max out of range
<b>0241</b>	MON_INV1_V24P_Cyclic
<b>0242</b>	MON_INV1_V24P_Differ
<b>0243</b>	The submodule INV2 has exceeded the 5 V minimum threshold. INV2 5 V min out of range
<b>0244</b>	The submodule INV2 has exceeded the 5 V minimum threshold. INV2 5 V min
<b>0245</b>	The submodule INV2 has exceeded the 5 V minimum threshold. INV2 5 V min
<b>0246</b>	n.a
<b>0247</b>	The submodule INV2 has exceeded the 5 V maximum threshold. INV2 5 V max
<b>0248</b>	The submodule INV2 has exceeded the 5 V maximum threshold. INV2 5 V max
<b>0249</b>	The submodule INV2 has exceeded the 5 V maximum threshold. INV2 5 V max out of range
<b>0250</b>	MON_INV2_V5P_Cyclic
<b>0251</b>	MON_INV2_V5P_Differ
<b>0252</b>	The submodule INV2 has exceeded the 24 V minimum threshold. INV2 24 V min out of range
<b>0253</b>	The submodule INV2 has exceeded the 24 V minimum threshold. INV2 24 V min
<b>0254</b>	The submodule INV2 has exceeded the 24 V minimum threshold. INV2 24 V min
<b>0255</b>	MON_INV2_V24P_Normal
<b>0256</b>	The submodule INV2 has exceeded the 24 V maximum threshold. INV2 24 V max
<b>0257</b>	The submodule INV2 has exceeded the 24 V maximum threshold. INV2 24 V max
<b>0258</b>	The submodule INV2 has exceeded the 24 V maximum threshold. INV2 24 V max out of range
<b>0259</b>	MON_INV2_V24P_Cyclic
<b>0260</b>	MON_INV2_V24P_Differ
<b>0261</b>	The submodule MRC1 has exceeded the 5 V minimum threshold. MRC1 5 V min out of range
<b>0262</b>	The submodule MRC1 has exceeded the 5 V minimum threshold. MRC1 5 V min
<b>0263</b>	The submodule MRC1 has exceeded the 5 V minimum threshold. MRC1 5 V min
<b>0264</b>	MON_MRC1_V5P_Normal
<b>0265</b>	The submodule MRC1 has exceeded the 5 V maximum threshold. MRC1 5 V max
<b>0266</b>	The submodule MRC1 has exceeded the 5 V maximum threshold. MRC1 5 V max
<b>0267</b>	The submodule MRC1 has exceeded the 5 V maximum threshold. MRC1 5 V max out of range
<b>0268</b>	MON_MRC1_V5P_Cyclic
<b>0269</b>	MON_MRC1_V5P_Differ
<b>0270</b>	The submodule MRC1 has exceeded the 24 V minimum threshold. MRC1 24 V min out of range

0271	The submodule MRC1 has exceeded the 24 V minimum threshold. MRC1 24 V min
0272	The submodule MRC1 has exceeded the 24 V minimum threshold. MRC1 24 V min
0273	MON_MRC1_V24P_Normal
0274	The submodule MRC1 has exceeded the 24 V maximum threshold. MRC1 24 V max
0275	The submodule MRC1 has exceeded the 24 V maximum threshold. MRC1 24 V max
0276	The submodule MRC1 has exceeded the 24 V maximum threshold. MRC1 24 V max out of range
0277	MON_MRC1_V24P_Cyclic
0278	MON_MRC1_V24P_Differ
0279	The submodule MRC2 has exceeded the 5 V minimum threshold. MRC2 5 V min out of range
0280	The submodule MRC2 has exceeded the 5 V minimum threshold. MRC2 5 V min
0281	The submodule MRC2 has exceeded the 5 V minimum threshold. MRC2 5 V min
0282	MON_MRC2_V5P_Normal
0283	The submodule MRC2 has exceeded the 5 V maximum threshold. MRC2 5 V max
0284	The submodule MRC2 has exceeded the 5 V maximum threshold. MRC2 5 V max
0285	The submodule MRC2 has exceeded the 5 V maximum threshold. MRC2 5 V max out of range
0286	MON_MRC2_V5P_Cyclic
0287	MON_MRC2_V5P_Differ
0288	The submodule MRC2 has exceeded the 24 V minimum threshold. MRC2 24 V min out of range
0289	The submodule MRC2 has exceeded the 24 V minimum threshold. MRC2 24 V min
0290	The submodule MRC2 has exceeded the 24 V minimum threshold. MRC2 24 V min
0291	MON_MRC2_V24P_Normal
0292	The submodule MRC2 has exceeded the 24 V maximum threshold. MRC2 24 V max
0293	The submodule MRC2 has exceeded the 24 V maximum threshold. MRC2 24 V max
0294	The submodule MRC2 has exceeded the 24 V maximum threshold. MRC2 24 V max out of range
0295	MON_MRC2_V24P_Cyclic
0296	MON_MRC2_V24P_Differ
0297	The submodule RFM (FIL1) has exceeded the minimum voltage threshold. FIL1 voltage min out of range
0298	The submodule RFM (FIL1) has exceeded the minimum voltage threshold. FIL1 voltage min
0299	The submodule RFM (FIL1) has exceeded the minimum voltage threshold. FIL1 voltage min
0300	MON_FIL1_VOLT_Normal
0301	The submodule RFM (FIL1) has exceeded the maximum voltage threshold. FIL1 voltage max
0302	The submodule RFM (FIL1) has exceeded the maximum voltage threshold. FIL1 voltage max
0303	The submodule RFM (FIL1) has exceeded the maximum voltage threshold. FIL1

	voltage max out of range
0304	MON_FIL1_VOLT_Cyclic
0305	MON_FIL1_VOLT_Differ
0306	The submodule RFM (FIL2) has exceeded the minimum voltage threshold. FIL2 voltage min out of range
0307	The submodule RFM (FIL2) has exceeded the minimum voltage threshold. FIL2 voltage min
0308	The submodule RFM (FIL2) has exceeded the minimum voltage threshold. FIL2 voltage min
0309	MON_FIL2_VOLT_Normal
0310	The submodule RFM (FIL2) has exceeded the maximum voltage threshold. FIL2 voltage max
0311	The submodule RFM (FIL2) has exceeded the maximum voltage threshold. FIL2 voltage max
0312	The submodule RFM (FIL2) has exceeded the maximum voltage threshold. FIL2 voltage max out of range
0313	MON_FIL2_VOLT_Cyclic
0314	MON_FIL2_VOLT_Differ
0315	MON_FIL3_VOLT_LowOOR
0316	MON_FIL3_VOLT_LowError
0317	MON_FIL3_VOLT_LowWarning
0318	MON_FIL3_VOLT_Normal
0319	MON_FIL3_VOLT_HighWarning
0320	MON_FIL3_VOLT_HighError
0321	MON_FIL3_VOLT_HighOOR
0322	MON_FIL3_VOLT_Cyclic
0323	MON_FIL3_VOLT_Differ
0324	The submodule FIL1 has exceeded the load current minimum threshold. FIL1 load current min out of range
0325	The submodule FIL1 has exceeded the load current minimum threshold. FIL1 load current min
0326	The submodule FIL1 has exceeded the load current minimum threshold. FIL1 load current min
0327	MON_ADC_FIL1_CUR_Normal
0328	The submodule FIL1 has exceeded the load current maximum threshold. FIL1 load current max
0329	The submodule FIL1 has exceeded the load current maximum threshold. FIL1 load current max
0330	The submodule FIL1 has exceeded the load current maximum threshold. FIL1 load current max out of range
0331	MON_ADC_FIL1_CUR_Cyclic
0332	MON_ADC_FIL1_CUR_Differ
0333	The submodule FIL2 has exceeded the load current minimum threshold. FIL2 load current

	min out of range
<b>0334</b>	The submodule FIL2 has exceeded the load current minimum threshold. FIL2 load current min
<b>0335</b>	The submodule FIL2 has exceeded the load current minimum threshold. FIL2 load current min
<b>0336</b>	MON_ADC_FIL2_CUR_Normal
<b>0337</b>	The submodule FIL2 has exceeded the load current maximum threshold. FIL2 load current max
<b>0338</b>	The submodule FIL2 has exceeded the load current maximum threshold. FIL2 load current max
<b>0339</b>	The submodule FIL2 has exceeded the load current maximum threshold. FIL2 load current max out of range
<b>0340</b>	MON_ADC_FIL2_CUR_Cyclic
<b>0341</b>	MON_ADC_FIL2_CUR_Differ
<b>0342</b>	The submodule RAC has exceeded the anode phase1 voltage minimum threshold. RAC phase 1 min out of range
<b>0343</b>	The submodule RAC has exceeded the anode phase1 voltage minimum threshold. RAC phase 1 min
<b>0344</b>	The submodule RAC has exceeded the anode phase1 voltage minimum threshold. RAC phase 1 min
<b>0345</b>	MON_RAC_VOLT1_Normal
<b>0346</b>	The submodule RAC has exceeded the anode phase1 voltage maximum threshold. RAC phase 1 max
<b>0347</b>	The submodule RAC has exceeded the anode phase1 voltage maximum threshold. RAC phase 1 max
<b>0348</b>	The submodule RAC has exceeded the anode phase1 voltage maximum threshold. RAC phase 1 max out of range
<b>0349</b>	MON_RAC_VOLT1_Cyclic
<b>0350</b>	MON_RAC_VOLT1_Differ
<b>0351</b>	The submodule RAC has exceeded the anode phase2 voltage minimum threshold. RAC phase 2 min out of range
<b>0352</b>	The submodule RAC has exceeded the anode phase2 voltage minimum threshold. RAC phase 2 min
<b>0353</b>	The submodule RAC has exceeded the anode phase2 voltage minimum threshold. RAC phase 2 min
<b>0354</b>	MON_RAC_VOLT2_Normal
<b>0355</b>	The submodule RAC has exceeded the anode phase2 voltage maximum threshold. RAC phase 2 max
<b>0356</b>	The submodule RAC has exceeded the anode phase2 voltage maximum threshold. RAC

	phase 2 max
<b>0357</b>	The submodule RAC has exceeded theanode phase2 voltage maximum threshold. RAC phase 2 max out of range
<b>0358</b>	MON_RAC_VOLT2_Cyclic
<b>0359</b>	MON_RAC_VOLT2_Differ
<b>0360</b>	The submodule RAC has exceeded theanode phase3 voltage minimum threshold. RAC phase 3 min out of range
<b>0361</b>	The submodule RAC has exceeded theanode phase3 voltage minimum threshold. RAC phase 3 min
<b>0362</b>	The submodule RAC has exceeded theanode phase3 voltage minimum threshold. RAC phase 3 min
<b>0363</b>	MON_RAC_VOLT3_Normal
<b>0364</b>	The submodule RAC has exceeded theanode phase3 voltage maximum threshold. RAC phase 3 max
<b>0365</b>	The submodule RAC has exceeded theanode phase3 voltage maximum threshold. RAC phase 3 max
<b>0366</b>	The submodule RAC has exceeded theanode phase3 voltage maximum threshold. RAC phase 3 max out of range
<b>0367</b>	MON_RAC_VOLT3_Cyclic
<b>0368</b>	MON_RAC_VOLT3_Differ
<b>0369</b>	The submodule MRC has exceeded theintermediate circuit current minimum threshold. MRC1 current min out of range
<b>0370</b>	The submodule MRC has exceeded theintermediate circuit current minimum threshold. MRC1 current min
<b>0371</b>	The submodule MRC has exceeded theintermediate circuit current minimum threshold. MRC1 current min
<b>0372</b>	MON_MRC1_CURRENT_Normal
<b>0373</b>	The submodule MRC has exceeded theintermediate circuit current maximum threshold. MRC1 current max
<b>0374</b>	The submodule MRC has exceeded theintermediate circuit current maximum threshold. MRC1 current max
<b>0375</b>	The submodule MRC has exceeded theintermediate circuit current maximum threshold. MRC1 current max out of range
<b>0376</b>	MON_MRC1_CURRENT_Cyclic
<b>0377</b>	MON_MRC1_CURRENT_Differ
<b>0378</b>	The submodule MRC has exceeded theintermediate circuit current minimum threshold. MRC2 current min out of range
<b>0379</b>	The submodule MRC has exceeded theintermediate circuit current minimum threshold. MRC2 current min

<b>0380</b>	The submodule MRC has exceeded the intermediate circuit current minimum threshold. MRC2 current min
<b>0381</b>	n.a.
<b>0382</b>	The submodule MRC has exceeded the intermediate circuit current maximum threshold. MRC2 current max
<b>0383</b>	The submodule MRC has exceeded the intermediate circuit current maximum threshold. MRC2 current max
<b>0384</b>	The submodule MRC has exceeded the intermediate circuit current maximum threshold. MRC2 current max out of range
<b>0385</b>	MON_MRC2_CURRENT_Cyclic
<b>0386</b>	MON_MRC2_CURRENT_Differ
<b>0387</b>	The submodule RCE has exceeded the 5V minimum threshold. RCE 5 V min out of range
<b>0388</b>	The submodule RCE has exceeded the 5V minimum threshold. RCE 5 V min
<b>0389</b>	The submodule RCE has exceeded the 5V minimum threshold. RCE 5 V min
<b>0390</b>	MON_RCE_V5P_Normal
<b>0391</b>	The submodule RCE has exceeded the 5V maximum threshold. RCE 5 V max
<b>0392</b>	The submodule RCE has exceeded the 5V maximum threshold. RCE 5 V max
<b>0393</b>	The submodule RCE has exceeded the 5V maximum threshold. RCE 5 V max out of range
<b>0394</b>	MON_RCE_V5P_Cyclic
<b>0395</b>	MON_RCE_V5P_Differ
<b>0396</b>	The submodule INV2 has exceeded the 24 V minimum threshold. RCE 24 V min out of range
<b>0397</b>	The submodule INV2 has exceeded the 24 V minimum threshold. RCE 24 V min
<b>0398</b>	The submodule INV2 has exceeded the 24 V minimum threshold. RCE 24 V min
<b>0399</b>	MON_RCE_V24P_Normal
<b>0400</b>	The submodule INV2 has exceeded the 24 V maximum threshold. RCE 24 V max
<b>0401</b>	The submodule INV2 has exceeded the 24 V maximum threshold. RCE 24 V max
<b>0402</b>	The submodule INV2 has exceeded the 24 V maximum threshold. RCE 24 V max out of range
<b>0403</b>	MON_RCE_V24P_Cyclic
<b>0404</b>	MON_RCE_V24P_Differ
<b>0405</b>	The submodule RCE has a broken temperature sensor. RCE temperature min out of range
<b>0406</b>	The submodule RCE has a broken temperature sensor. RCE temperature min
<b>0407</b>	MON_RCE_IND1_TEMP_LowWarning
<b>0408</b>	MON_RCE_IND1_TEMP_Normal
<b>0409</b>	The submodule RCE has exceeded temperature of 60 °C. RCE temperature max
<b>0410</b>	The submodule RCE has exceeded temperature of 70 °C. RCE temperature max
<b>0411</b>	The submodule RCE has a broken temperature sensor. RCE temperature max out of range
<b>0412</b>	MON_RCE_IND1_TEMP_Cyclic

<b>0413</b>	MON_RCE_IND1_TEMP_Differ
<b>0414</b>	The submodule RCE has a broken temperature sensor. RCE temperature min out of range
<b>0415</b>	The submodule RCE has a broken temperature sensor. RCE temperature min
<b>0416</b>	MON_RCE_IND2_TEMP_LowWarning
<b>0417</b>	MON_RCE_IND2_TEMP_Normal
<b>0418</b>	The submodule RCE has exceeded temperature of 60 °C. RCE temperature max
<b>0419</b>	The submodule RCE has exceeded temperature of 70 °C. RCE temperature max
<b>0420</b>	The submodule RCE has an broken tempsensor. RCE temperature max out of range
<b>0421</b>	MON_RCE_IND2_TEMP_Cyclic
<b>0422</b>	MON_RCE_IND2_TEMP_Differ
<b>0423</b>	The submodule RCE has exceeded theanode phase1 voltage minimum threshold. RCE voltage 1 min out of range
<b>0424</b>	The submodule RCE has exceeded theanode phase1 voltage minimum threshold. RCE voltage 1 min
<b>0425</b>	The submodule RCE has exceeded theanode phase1 voltage minimum threshold. RCE voltage 1 min
<b>0426</b>	MON_RCE_VOLT1_Normal
<b>0427</b>	The submodule RCE has exceeded theanode phase1 voltage maximum threshold. RCE voltage 1 max
<b>0428</b>	The submodule RCE has exceeded theanode phase1 voltage maximum threshold. RCE voltage 1 max
<b>0429</b>	The submodule RCE has exceeded theanode phase1 voltage maximum threshold. RCE voltage 1 max out of range
<b>0430</b>	MON_RCE_VOLT1_Cyclic
<b>0431</b>	MON_RCE_VOLT1_Differ
<b>0432</b>	The submodule RCE has exceeded theanode phase1 voltage minimum threshold. RCE voltage 2 min out of range
<b>0433</b>	The submodule RCE has exceeded theanode phase1 voltage minimum threshold. RCE voltage 2 min
<b>0434</b>	The submodule RCE has exceeded theanode phase1 voltage minimum threshold. RCE voltage 2 min
<b>0435</b>	MON_RCE_VOLT2_Normal
<b>0436</b>	The submodule RCE has exceeded theanode phase1 voltage maximum threshold. RCE voltage 2 max
<b>0437</b>	The submodule RCE has exceeded theanode phase1 voltage maximum threshold. RCE voltage 2 max
<b>0438</b>	The submodule RCE has exceeded theanode phase1 voltage maximum threshold. RCE voltage 2 max out of range
<b>0439</b>	MON_RCE_VOLT2_Cyclic

0440	MON_RCE_VOLT2_Differ
0441	The submodule RCE has a broken temperature sensor. RCE temperature min out of range
0442	The submodule RCE has a broken temperature sensor. RCE temperature min
0443	n MON_RCE_TEMP_LowWarning
0444	MON_RCE_TEMP_Normal
0445	The submodule RCE has exceeded temperature of 60 °C. RCE temperature max
0446	The submodule RCE has exceeded temperature of 70 °C. RCE temperature max
0447	The submodule RCE has an broken temp sensorn RCE temperature max out of range
0448	MON_RCE_TEMP_Cyclic
0449	MON_RCE_TEMP_Differ
0450	The protection module has an broken temp sensorn PM temperature min out of range
0451	The protection module has an broken temp sensorn PM temperature min
0452	MON_PM_Temp_LowWarning
0453	MON_PM_Temp_Normal
0454	The protection module has exceeded temperature of 60 °C. PM temperature max
0455	The protection module has exceeded temperature of 70 °C. PM temperature max
0456	The protection module has an broken temp sensorn PM temperature max out of range
0457	MON_PM_Temp_Cyclic
0458	MON_PM_Temp_Differ
2048	DEFLib Message
2049	DEFLib Message
2050	DEFLib Message
2304	The line frequency is not within 47 Hz to53 Hz or 57 Hz to 63Hz. Line frequency out of range. FPGA event
2305	FPGA event
2306	FPGA event
2307	FPGA event
2308	The input voltage is not a sinus waveand/or does not fulfill the proper zerocrossingn Input voltage no zero crossing. FPGA event
2309	FPGA event
2310	FPGA event
2311	FPGA event
2312	The submodule GCB has exceeded the2.5 V thresholds. GCB 2.5 V FPGA threshold. FPGA event
2313	The submodule GCB has exceeded the1.5 V thresholds. GCB 1.5 V FPGA threshold. FPGA event
2314	The submodule GCB has exceeded the1.1 V thresholds. GCB 1.1 V FPGA threshold. FPGA event
2315	The submodule GCB has exceeded the3.3 V thresholds. GCB 3.3 V FPGA threshold. FPGA

	event
2316	The submodule GCB has exceeded the -15 V thresholds. GCB -15 V FPGA threshold. FPGA event
2317	The submodule GCB has exceeded the 15 V thresholds. GCB 15 V FPGA threshold. FPGA event
2318	The submodule GCB has exceeded the 5V thresholds. GCB 5 V FPGA threshold. FPGA event
2319	The submodule GCB has exceeded the 24 V thresholds. GCB 24 V FPGA threshold. FPGA event
2816	Internal SW error: Generator software error. Generator software error Internal FW error (class pointer missing)
2817	Internal SW error: Generator configuration parameter error. Generator configuration parameter error Wrong parameter value
3072	n.a.
3073	Internal SW error: Wrong mode table counter. Wrong mode table counter
3074	n.a.
3075	n.a. Mode table data not allowed in this state
3076	Internal SW error: GCM not readable. GCM not readable. XML file cannot be parsed
3077	Internal SW error: GCM does not exist. GCM does not exist. XML file cannot be opened
3078	n.a. Number of modes too high
3079	Internal SW error: No mode table received. No mode table received. FW accesses non received mode data storage
3080	ML mode number Wrong mode number in scan load command
3081	State name. Current state of control state machine
3082	Internal SW error: Reset during main initialization. Received a reset command but initprocess failed
3083	n.a. Received a reset command but safety circuit is open
3084	Internal SW error: Internal software error. Internal software error
3085	Internal SW error: Software error without error message sent. Internal firmware error
3086	n.a. File operation error
3087	n.a. File operation error
3088	n.a. File operation error
3089	n.a. File operation error
3328	Adapter detected implausible exposure parameters. Exposure parameters not valid The current exposure parameter is wrong.
3329	Internal SW error: Communication error between Adapter and generator software Internal software communication error Generator does not response to life check.
3330	An error occurred in calculation of dose compensation AEC dose compensation calculation error Dose compensation failed in calculation.
3331	The message contains wrong data. ADP message not valid The control message is not

	valid.
3332	The main contact is not pressed within 15s after pre contact. No main contact after pre contact. The main contact does not work.
3333	The configured maximum generator power does not correspond to generator hardware. Max power configuration errorn The configured KW does not fit what generator can provide.
3334	The firmware of power board(s) can notbe downloaded. Power board firmware download failed. Firmware of power board cannot be downloaded.
3335	The heat unit calculation started before setting system time. Heat unit calculation before system time. The heat unit calculation needs the setting of system time.
3336	Generator detected pre contact signal before main contact signal. Pre contact before main contact. The HK is pressed before VK.
3337	The generator can not calculate theworking parameters with the exposure parameters from system. Working parameter calculation errorn Calculation of working parameter fails.
3338	Because of the limitation of license theselected function cannot be executed. License error. License problem
3339	The connection to the system is broken. Connection to system is brokenn The connection to system is broken.
3340	n.a. Connection to system is re-established. The connection to system is established again.
3584	The CRC of generator configuration fileuser. Generator configuration CRC errorn The CRC of configuration file is wrong. This file was changed by the user.
3585	The new CRC checksum is generatedand inserted into the correspondingconfiguration file. Generator configuration CRC missing.
3586	Generator caf file can not be read. Generator caf file read failed. Error reading CAF file.
3587	Generator aaf file can not be read. Generator aaf file read failed. Error reading AAF file.
3588	Information from restoren Information during restore.
3589	Information from restoren Information during restore.
3590	Information from restoren Information during restore.
3591	Generator caf file can not be restored
3592	Generator aaf file can not be restored
3593	The PMS restore process was aborted. PMS restore aborted. The restore is aborted by the user.
3594	Information from backup. Information during restore.
3595	Information from backup. Information during restore.
3596	Information from backup. Information during restore.
3597	Generator caf file can not be backed up. Backup of generator caf file failed. Gen cannot restore gen.caf.
3598	Generator aaf file can not be backed up. Backup of generator aaf file failed. Gen cannot restore all aaf files.

3599	The PMS backup process was aborted. PMS backup aborted. The restore is aborted by the user.
3600	The transfer of adjust file between system and generator failed. PMS adjust file transfer failed. The file transfer failed.
3601	The AEC firmware download from system to generator failed. PMS AEC download failed. The download of AEC firmware fails.
3602	The firmware download from system to generator failed. PMS firmware download failed. The download of firmware from server fails.
3840	Communication between generator SW and protection module failed. PM communication error. The communication to protection module fails.
3841	Protection module ROM selftest failed. PM ROM selftest failed. ROM check failed during selftest.
3842	Protection module RAM selftest failed. PM RAM selftest failed. RAM check failed during selftest.
3843	Protection module selftest initialization failed. PM selftest initialization failed. Selftest initializing failed.
3844	X-ray release active during selftest. PM X-ray release active during selftest. X-ray release signal error.
3845	Protection module ignition relay failure PM ignition relay failure Ignition relay error.
3846	Protection module ignition relay failure PM ignition relay failure Ignition relay error signal before not okay.
3847	Protection module ignition relay failure PM ignition relay failure Ignition relay error signal after not okay.
3848	Protection module INV driver power supply failure PM INV driver power supply failure Invert driver supply error.
3849	Protection module door contact. PM door contact. Door opened.
3850	Protection module XTA temperature/pressure PM XTA temperature. PM XTA pressure
3851	Protection module undefined internal error. PM undefined internal error. Error not known.
3852	The protection module has exceeded the 3.3 V minimum threshold. PM 3.3 V max. Overvoltage 3.3 V.
3853	The protection module has exceeded the 3.3 V maximum threshold. PM 3.3 V min. Undervoltage 3.3 V.
3854	The protection module has exceeded the 5 V minimum threshold. PM 5 V min. Undervoltage 5 V.
3855	The protection module has exceeded the 5 V maximum threshold. PM 5 V max. Overvoltage 5 V.
3856	The protection module has exceeded the 15 V minimum threshold. PM 15 V min. Undervoltage +15 V.
3857	The protection module has exceeded the 15 V maximum threshold. PM 15 V max. Overvoltage +15 V.

<b>3858</b>	The protection module has exceeded the -15 V minimum threshold. PM -15 V min. Undervoltage -15 V.
<b>3859</b>	The protection module has exceeded the -15 V maximum threshold. PM -15 V max. Overvoltage -15 V.
<b>3860</b>	Protection module selftest failed. PM selftest failed. Selftest addressed a illegal state.
<b>3861</b>	Protection module selftest failed. PM selftest failed. Selftest not allowed because of X-rayrelease closed.
<b>3862</b>	The protection module has exceeded the 24 V minimum threshold. PM 24 V min Undervoltage 24 V.
<b>3863</b>	The protection module has exceeded the 24 V maximum threshold. PM 24 V max. Overvoltage 24 V.
<b>3864</b>	Protection module temperature max. PM temperature max. Temperature exceeds.
<b>3865</b>	Protection module Ut. PM Ut. UT_act error.
<b>3866</b>	Protection module Ut asymmetry. PM Ut asymmetry. UT_act_Delta error.
<b>3867</b>	Protection module It. PM It. IT_act error.
<b>3868</b>	Protection module It asymmetry. PM It asymmetry. IT_act_Delta error.
<b>3869</b>	Protection module nominal exposure time max. PM nominal exposure time max. Exposure time exceeds.
<b>3870</b>	Protection module kW max. PM kW max. 56 kW exceeds.
<b>3871</b>	Protection module exposure time max. PM exposure time max. 10 min Exposure time exceeds.
<b>3872</b>	The protection module has exceeded the 3.3 V minimum threshold. PM 3.3 V min Undervoltage 3.3 V warning.
<b>3873</b>	The protection module has exceeded the 3.3 V maximum threshold. PM 3.3 V max. Overvoltage 3.3 V warning.
<b>3874</b>	The protection module has exceeded the 5 V minimum threshold. PM 5 V min Undervoltage 5 V warning.
<b>3875</b>	The protection module has exceeded the 5 V maximum threshold. PM 5 V max. Overvoltage 5 V warning.
<b>3876</b>	The protection module has exceeded the 15 V minimum threshold. PM 15 V min Undervoltage +15 V warning.
<b>3877</b>	The protection module has exceeded the 15 V maximum threshold. PM 15 V max. Overvoltage +15 V warning.
<b>3878</b>	The protection module has exceeded the -15 V minimum threshold. PM -15 V min Undervoltage -15 V warning.
<b>3879</b>	The protection module has exceeded the -15 V maximum threshold. PM -15 V max. Overvoltage -15 V warning.
<b>3880</b>	Protection module Ut. PM Ut.
<b>3881</b>	Protection module Ut asymmetry. PM Ut asymmetry

<b>3882</b>	Protection module It.
<b>3883</b>	Protection module It asymmetry.
<b>3884</b>	Protection module temperature max.PM temperature max.
<b>3885</b>	n.a. protection module X-ray release warning
<b>3886</b>	Communication between generator SW and protection module failed. PM communication error
<b>3887</b>	X-ray indicator not active during exposure. X-ray indicator not active during exposure
<b>3888</b>	X-ray indicator active without exposure. X-ray indicator active without exposure
<b>0512</b>	Internal SW error: UART Parity errorn UART Parity. FPGA event
<b>0513</b>	Internal SW error: UART StopBit errorn UART Stop Bit. FPGA event
<b>0514</b>	The operator has opened the door duringexposure. Door switch activated during exposure. FPGA event
<b>0515</b>	The XTA has reached maximum temperature/ pressure. XTA temperature/pressure max. FPGA event
<b>0516</b>	The XTA temperature has reached 70 °C. XTA temperature max. FPGA event
<b>0517</b>	The feedback signal for the X-ray lampsignal is not plausible. X-ray lamp feedback warning. FPGA event
<b>0518</b>	n.a. COM_PM_SYSTEM_OK_wrng. FPGA event
<b>0519</b>	n.a. COM_GEN_OFF_info. FPGA event
<b>0520</b>	n.a. COM_Door_Contact_closed. FPGA event
<b>0521</b>	n.a. COM_Intr_link_Bit09. FPGA event
<b>0522</b>	n.a. COM_Intr_link_Bit10. FPGA event
<b>0523</b>	n.a. COM_Intr_link_Bit11. FPGA event
<b>0524</b>	n.a. COM_Intr_link_Bit12. FPGA event
<b>0525</b>	n.a. COM_Intr_link_Bit13. FPGA event
<b>0526</b>	n.a. COM_Intr_link_Bit14. FPGA event
<b>0527</b>	n.a. COM_Intr_link_Bit15. FPGA event
<b>0528</b>	Internal SW error: HW selftest wrong step. HW selftest failed
<b>0529</b>	Internal SW error: HW selftest not allowed. HW selftest failed
<b>0530</b>	The selftest value for positive high voltage circuit has exceeded allowed tolerance. High voltage (pos) selftest failed
<b>0531</b>	The selftest value for negative high voltage circuit has exceeded allowed tolerance. High voltage (neg) selftest failed
<b>0532</b>	The selftest value for positive high voltage circuit has exceeded allowed tolerance. High voltage (pos) selftest failed
<b>0533</b>	The selftest value for negative high voltage circuit has exceeded allowed tolerance. High voltage (neg) selftest failed
<b>0534</b>	The selftest value for It DAC scaling has exceeded allowed tolerance. Tube current selftest failed

0535	The selftest value for tube current circuit has exceeded allowed tolerance. Tube current selftest failed
0536	The selftest value for tube current circuit has exceeded allowed tolerance. Tube current selftest failed OR The safety circuit for X-ray release is either active or defective. X-ray release circuit selftest failed
0537	The selftest value for tube current circuit has exceeded allowed tolerance. Tube current selftest failed OR The selftest of the external grid has been failed. Grid selftest failed
0538	The selftest value for tube current circuit has exceeded allowed tolerance. Tube current selftest failed OR n.a. Selftest failed
0540	The calibration switch is active during selftest. Calibration switch active during selftest
0541	The calibration switch is active during operation. Calibration switch active during operation
0542	n.a.
0543	The mAs measurement plug is open. mAs measurement plug open
0544	The pre contact is active during selftest. Pre contact active during selftest
0545	The main contact is active during selftest. Main contact active during selftest
0546	The door contact is open during selftest. Door contact open during selftest
0547	The requested anode frequency is too high. COM anode frequency too high. Mode table check XRS
0548	The requested anode frequency is too low. COM anode frequency too low. Mode table check XRS
0549	The requested tube current is too high. COM It too high. Mode table check XRS
0550	The requested tube current is too low. COM It too low. Mode table check XRS
0551	The requested tube voltage is too high. COM Ut too high. Mode table check XRS
0552	The requested tube voltage is too low. COM Ut too low. Mode table check XRS
0553	The requested scan time is too high. COM scan time too high. Mode table check XRS
0554	The requested scan time is too low. COM scan time too low. Mode table check XRS
0555	The requested power is too high. COM power too high. Mode table check XRS
0556	The requested power is too low. COM power too low. Mode table check XRS
0557	n.a. COM data corrupt. Mode table check XRS
0558	n.a. COM data type. Mode table check XRS
0559	The requested focus is not known. COM XTA focus unknown. Mode table check XTA
0560	The requested anode frequency exceeds the allowed XTA anode frequency. COM XTA anode frequency too high. Mode table check XTA
0561	n.a. Mode table check XTA
0562	The requested tube currents exceeds the maximum XTA tube current. COM XTA It too high. Mode table check XTA
0563	The requested tube currents exceeds the minimum XTA tube current. COM XTA It too low. Mode table check XTA
0564	The requested tube voltages exceeds the maximum XTA tube voltage. COM XTA Ut too

	high. Mode table check XTA
0565	The requested tube voltages exceeds the minimum XTA tube voltage. COM XTA Ut too low. Mode table check XTA
0566	The requested powers exceeds the maximum XTA power. COM XTA power too high. Mode table check XTA
0567	The requested powers exceeds the minimum XTA power. COM XTA energy too high. Mode table check XTA
0568	The requested scan time exceeds the maximum XTA scan time. COM XTA scan time too high. Mode table check XTA
0569	I_T_Control switch. Filament switch. Mode table check XRS
0570	I_T_Control switch. X-ray switch. Mode table check XRS
0571	Dose_Control switch. Filament switch. Mode table check XRS
0572	Dose_Control switch. X-ray switch. Mode table check XRS
0573	Dose_Control switch. Dose modulation type. Mode table check XRS
0574	FocusNumber. Mode table check XRS
0575	CBG. limit. FW selection check
0576	BOX. limit. FW selection check
0577	XTA. limit. FW selection check
0578	FPGA. limit. FW selection check
0579	The requested mAs are too high. COM mAs too low. Mode table check XRS
0580	The requested mAs are too low. COM mAs too high. Mode table check XRS
0581	The requested mAs are exceeding the maximum XTA mAs. COM XTA mAs too high. Mode table check XTA
0582	The expsoure shall not be interrupted by the user by releasing the exposurebutton. X-ray aborted by user. The exposure is aborted by the relaseof exposure button.
0583	The current hardware configuration has deviation to the configured one. wrong hardware configuration. Hardware is not configured as sepecified.
0584	COM_Exposure_Without_Release_Signal
0585	COM_ScanLoad_Door_Contact_Err
0586	COM_ScanLoad_Xray_Man_Enable_Err
0587	COM_SelfTest_Not_Allowed_In_This-State
0588	COM_SelfTest_Already_Started
0589	COM_Board_Configuration_Error
0768	FIL1 has exceeded the load current minimum threshold. FIL1 I_load min. FPGA event
0769	FIL1 has exceeded the load current maximum threshold. FIL1 I_load max. FPGA event
0770	FIL1 has exceeded the number of allowed driver faults. FIL1 driver fault. FPGA event
0771	FIL1 has exceeded the tolerance of driver power supply. FIL1 driver not ready. FPGA event
0772	FIL2 has exceeded the load current minimum threshold. FIL2 I_load min. FPGA event
0773	FIL2 has exceeded the load current maximum threshold. FIL2 I_load max. FPGA event

<b>0774</b>	FIL2 has exceeded the number of allowed driver faults. FIL2 driver fault. FPGA event
<b>0775</b>	FIL2 has exceeded the tolerance of driver power supply. FIL2 driver not ready. FPGA event
<b>0776</b>	Frequency of FIL1 is out of range. FIL1 frequency out of rangen. FPGA event
<b>0777</b>	Frequency of FIL2 is out of range. FIL2 frequency out of rangen. FPGA event
<b>0778</b>	FPGA event
<b>0779</b>	FPGA event
<b>0780</b>	The tube current has exceeded allowedminimum tolerance. Tube current min.FPGA event
<b>0781</b>	The tube current has exceeded allowedmaximum tolerance. Tube current max.FPGA event
<b>0782</b>	FPGA event
<b>0783</b>	The tube current has exceeded allowedmaximum tolerance. Tube current max.FPGA event
<b>0784</b>	FPGA event
<b>0785</b>	FPGA event
<b>0786</b>	FIL1 blanking activen FIL1 blanking active.FPGA event
<b>0787</b>	FPGA event
<b>0788</b>	FPGA event
<b>0789</b>	FPGA event
<b>0790</b>	FIL2 blanking activen FIL2 blanking active.FPGA event
<b>0791</b>	FPGA event
<b>0792</b>	FPGA event
<b>0793</b>	FPGA event
<b>0794</b>	FPGA event
<b>0795</b>	FPGA event
<b>0796</b>	FPGA event
<b>0797</b>	FPGA event
<b>0798</b>	FPGA event
<b>0799</b>	FPGA event
<b>0800</b>	Internal SW error: FIL selftest failed. FIL selftest failed.
<b>0801</b>	Internal SW error: FIL selftest failed. FIL selftest failed.
<b>0802</b>	The selftest value for filament 1 current circuit has exceeded allowed tolerance. FIL 1 selftest failed (FIL 1ament load current out of range).
<b>0803</b>	The selftest value for filament 1 current circuit has exceeded allowed tolerance. FIL 1 selftest failed (FIL 1ament load current limit).
<b>0804</b>	The selftest value for filament 1 current circuit has exceeded the maximum tolerance. FIL 1 selftest failed (FIL 1ament current max).
<b>0805</b>	The selftest value for filament 1 current circuit has exceeded allowed tolerance. FIL 1 selftest failed (max FPGA event wrong).
<b>0806</b>	The selftest value for filament 1 current circuit has exceeded the minimum tolerance. FIL 1 selftest failed (FIL 1ament current min).
<b>0807</b>	The selftest value for filament 1 current circuit has exceeded allowed tolerance. FIL 1

	selftest failed (mi. FPGA event wrong).
<b>0808</b>	FIL 1 is defect. FIL 1 is defect.
<b>0809</b>	FIL 1 is blocked. FIL 1 is blocked.
<b>0810</b>	The selftest value for filament 2 current circuit has exceeded allowed tolerance. FIL 2 selftest failed (FIL 2ament load current out of range).
<b>0811</b>	The selftest value for filament 2 current circuit has exceeded allowed tolerance. FIL 2 selftest failed (FIL 2ament load current limit).
<b>0812</b>	The selftest value for filament 2 current circuit has exceeded the maximum tolerance. FIL 2 selftest failed (FIL 2ament current max).
<b>0813</b>	The selftest value for filament 2 current circuit has exceeded allowed tolerance. FIL 2 selftest failed (max FPGA event wrong).
<b>0814</b>	The selftest value for filament 2 current circuit has exceeded the minimum tolerance. FIL 2 selftest failed (FIL 2ament current min).
<b>0815</b>	The selftest value for filament 2 current circuit has exceeded allowed tolerance. FIL 2 selftest failed (mi. FPGA event wrong).
<b>0816</b>	FIL 2 is defect. FIL 2 is defect.
<b>0817</b>	FIL 2 is blocked. FIL 2 is blocked.
<b>0818</b>	All emitters are defect. All emitters defect.
<b>0819</b>	FIL adapt procedure failed: Wrong focus selected. FIL adapt wrong focus.
<b>0820</b>	FIL adapt procedure failed: Tube current not reached. FIL adapt approach It not reached.
<b>0821</b>	FIL adapt procedure failed: Deviation ofthe tube current compared to the calculated value too high. FIL adapt max difference exceeded.
<b>0822</b>	FIL adapt procedure failed: Internal SW error. FIL adapt failed.
<b>0823</b>	FIL adapt procedure failed: Inverter parameter calculation failed.
<b>0824</b>	FIL adapt procedure failed: First pointsbe fore the Pre-Filadapt are not correct. FIL adapt first points not correct.
<b>0825</b>	FIL adapt procedure: Tube current too high in Filament adaption Check. FIL adapt check IT too high.
<b>0826</b>	FIL adapt procedure: Tube current too low in Filament adaption Check. FIL adapt check IT too low.
<b>0827</b>	The XRS_A process on the CBG (Control Board Generator) reports the Filament Adaption Check result.
<b>0828</b>	FIL adapt procedure failed: FPGA event detected. FIL adapt event from FPGA
<b>0829</b>	Filament adaption file for FIL1 missing. FIL1 adapt missing.
<b>0830</b>	Filament adaption file for FIL2 missing. FIL2 adapt missing.
<b>0831</b>	FIL adapt procedure: Filament adaption scan (first adapt) has wrong tube voltage. Wrong tube voltage for pre FIL adapt.
<b>0832</b>	FIL adapt procedure: Filament adaption scan (second adapt) has wrong tube voltage. Wrong tube voltage for main FIL adapt.

0833	FIL adapt procedure: First adapt is invalid. Pre FIL adapt not valid.
0834	FIL adapt procedure: FIL adapt failed. FIL adapt failed.
0835	LUT type
0836	LUT type
0837	LUT type
0838	The XRS_A process on the CBG (ControlBoard Generator) reports the Filament Adaption working point parameters. Tube current, focus (high byte) and tube voltage (low byte).
1798	AEC_MIN_DOSE_ERR
9997	unknown Error
9998	Generator connection failure
9999	The mAs value is out of range

▣ NingboEmgCrs

Code	Error Message
001	Generator CPU EPROM checksum error
002	Generator CPU EEPROM data checksum error
003	Generator CPU NVRAM error
004	Generator CPU Real Time Clock error
005	Main Contactor error
006	Rotor Fault
007	Filament Fault
008	kV / mA Fault (previously known as Beam Fault)
009	Power Supply Not Ready
010	No KV during exposure
011	mA during exposure too high
012	mA during exposure too low
013	Manually Terminated Exposure
014	AEC Back-up Timer - Exposure Terminated
015	AEC MAS Exceeded - Exposure Terminated
016	Tomo Back-up Timer - Exposure Terminated
017	Uncalibrated Exposure Parameter
018	Preparation Time-out Error
019	Anode Heat Limit
020	Thermal Switch Interlock #1 Error
021	Thermal Switch Interlock #2 Error
022	Door Interlock Error
023	Collimator Interlock Error
024	Cassette Interlock Error

025	II Safety Interlock Error
026	Spare Input Interlock Error
027	Receptor Time-out Error - Receptor did not respond within time-out
028	Prep Input active during Initialization Phase
029	X-ray Input active during Initialization Phase
030	Fluoro Input active during Initialization Phase
031	Communication Error Remote Fluoro
032	Communication Error Console
033	Lithium Battery Low Voltage Error
034	+12VDC Error
035	-12VDC Error
036	+15VDC Error
037	-15VDC Error
038	Calibration Data Corrupt Error
039	AEC Data Corrupt Error
040	Fluoro Data Corrupt Error
041	Receptor Data Corrupt Error
042	Tube Data Corrupt Error
043	High Voltage Error - KV detected in non x-ray state
044	Invalid Communication Message
045	Communication Message Not Supported
046	Communication Message Not Allowed
047	Fluoro Timer Limit Error
048	Focus Mismatch Error
049	Not Enabled Error
050	Generator Limit Data Corrupt Error
051	AEC Feedback Error (No Feedback Signal Detected)
052	High Small Focus Filament Current Error in Standby
053	High Large Focus Filament Current Error in Standby
054	AEC Reference out of range
055	No Fields Selected in AEC mode
056	No Tube Programmed
057	AEC Stop signal in wrong state
058	Console Back-Up Timer
059	Housing Heat Limit Exceeded
060	High KV Error
061	Low KV Error
062	EXP_SW signal active in standby state

063	Factory Defaults Enabled
064	No Exposure Release
065	Tomo Device Error
066	No Sync Pulse Input
067	Power Supply Duty Cycle Limit
070	Software Key Error
071	DAP Dose Overflow
072	DAP Device Error
073	DAP Data Error
074	Table Communication Error
075	Table Emergency Stop
100	Calibration Error - Maximum mA Exceeded
101	Calibration Error - Calibration Data Table Exceeded
102	Calibration Error - Maximum Filament Current Exceeded
103	Calibration Error - Manually Terminated
104	Calibration Error - No mA
105	Calibration Error - Minimum mA not calibrated
200	Anode Warning Level Exceeded
201	Fluoro Timer Warning Level Exceeded
202	Generator KW Limit
203	Generator KV Limit
204	Generator MA Limit
205	Generator MS Limit
206	Generator MAS Limit
207	Tube KW Limit
208	Tube KV Limit
209	Tube MA Limit
210	Tube MAS Limit
211	Calibration Limit, Selected Parameter not Calibrated
212	Generator AEC Density Limit
213	Invalid Communication Parameter
214	Housing Heat Warning
215	CT Termination Input Wrong State
216	Deselect Tomo Table
217	Select Tomo Angle
218	Invalid Tomo Angle
219	Generator PPS Limit
220	Generator Power Supply Duty Cycle Warning

<b>221</b>	DAP Device Not Ready
<b>222</b>	DAP Rate Warning Level Exceeded
<b>223</b>	DAP Accumulated Warning Level Exceeded
<b>224</b>	Parameter Limit
<b>225</b>	Fluoro Focus Auto Changeover (default focus damaged)
<b>999</b>	Generator connection failure

## 9. Additional Function for Integration

### 9.1 How to Use the Second Monitor

Besides the main monitor for **VXvue**, you can display 'Second Monitor' on the sub monitor mounted on the connected tube with U-ARM by using the Windows monitor extension function. You can check or choose the study information as well as check and adjust the operating information of the integrated equipment.



- On the second monitor, the main screen of **VXvue** cannot be displayed with the second one at the same time.



- In case of using Second Monitor, you should inactivate the screen auto-rotate function which is supported by the tablet PC under Microsoft Window 8 or higher.
  - Windows 8 or 8.1: Control panel → Display → Resolution → uncheck 'Allow the screen to auto-rotate'
  - Windows 10: Task bar → Action center → activate 'Rotation Lock'

#### 9.1.1 How to Interlock Second Monitor

- It is available when Generator, Collimator, equipment, and DAP are interlocked in **VXSetup**.
- Sub-monitor connection (Tube mount / Touch) other than a main monitor should be made in the PC in where **VXvue** is installed.
  - When screen display direction changes, the touch directional coordinates in a monitor should also be changed.

Click the **Update** button by going to Setting mode → Integration → General에서 Show second control monitor in VXvue, and restart the device to apply **Second Monitor**.

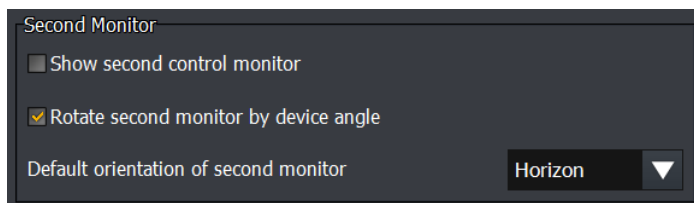


- When using more than 2 monitors, connect them before **VXvue** execution. If not, an error may occur.
- The monitor resolution on Tube should be at least 1024X768 or 768X1024 to successfully display Second Monitor.

### 9.1.2 How to Use the Second Monitor in VXvue

#### Second Monitor

Go to **VXvue** - **Setting** mode → **Integration** → **General** panel and configure **Second Monitor** attached to the equipment.



Option	Description
<b>Show second control monitor</b>	When a number of monitor is 2 or more, it displays <b>Second Monitor</b> on the second monitor.
<b>Rotate second monitor by device angle</b>	Determines whether to rotate the monitor installed by the current device angle or not.
<b>Default orientation of second monitor</b>	Sets the default orientation on the monitor installed in the device. <ul style="list-style-type: none"> <li>• <b>Horizon:</b> Monitor is horizontally installed</li> <li>• <b>Vertical:</b> Monitor is vertically installed</li> </ul>

- Second Monitor screen is separately displayed on the sub-monitor.
- You can set the default orientation of the Second monitor screen. (Horizon / Vertical)
  - Make sure to click the **Update** button at the top left corner to complete setting.
  - Once **VXvue** ends, it goes back to the default orientation.

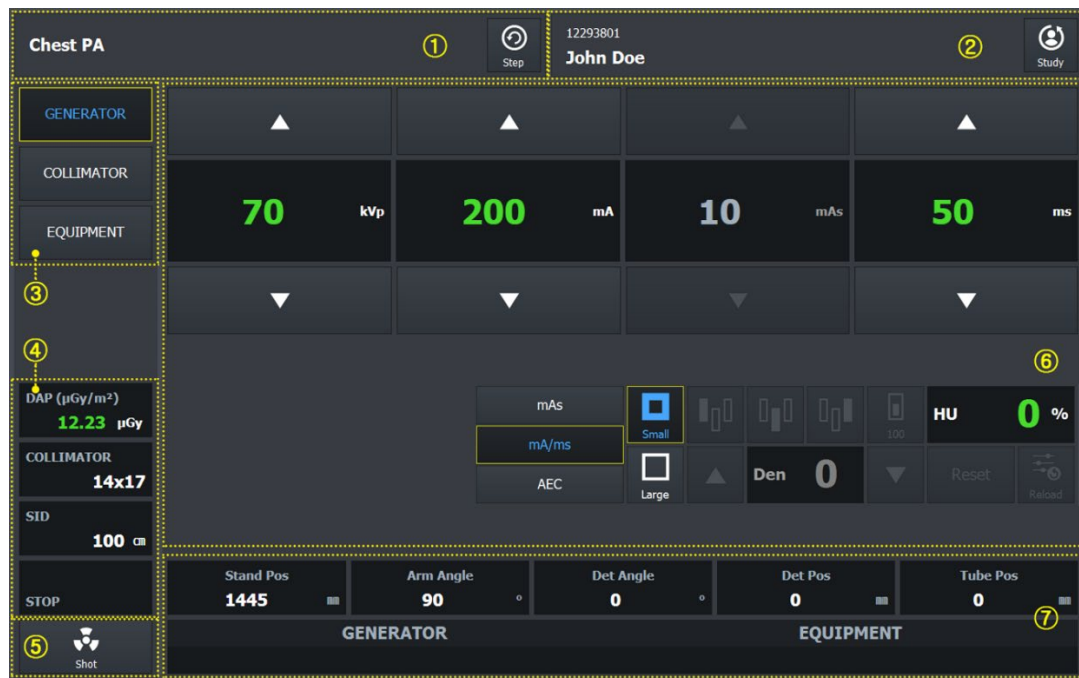


- **Second Monitor** is unavailable in **VXvue Vehicle**



- The second monitor cannot be used if **VXvue** is connected with **Sedecal\_WM** or **Quantum** generator, which console screen displays separately.

## Horizontal mode (Default)



① Shows a step to be shot. Click the **Step** button on the right to change the step.

② Shows information of the currently selected patient and study. Click the **Study** button to choose and change the patient and study information in worklist.

③ Select equipment such as generator, collimator, and equipment to indicate them in the second monitor. The information of the selected equipment is showed on the area of no.6.

④ Shows the size of collimator area, SID, mobile state of equipment, and DAP value of the previous image.



- The DAP value is indicated when DAP is integrated with **VXvue** only.

⑤ Shows the ready and shooting status of the generator.

⑥ Shows the information related to the currently selected equipment.

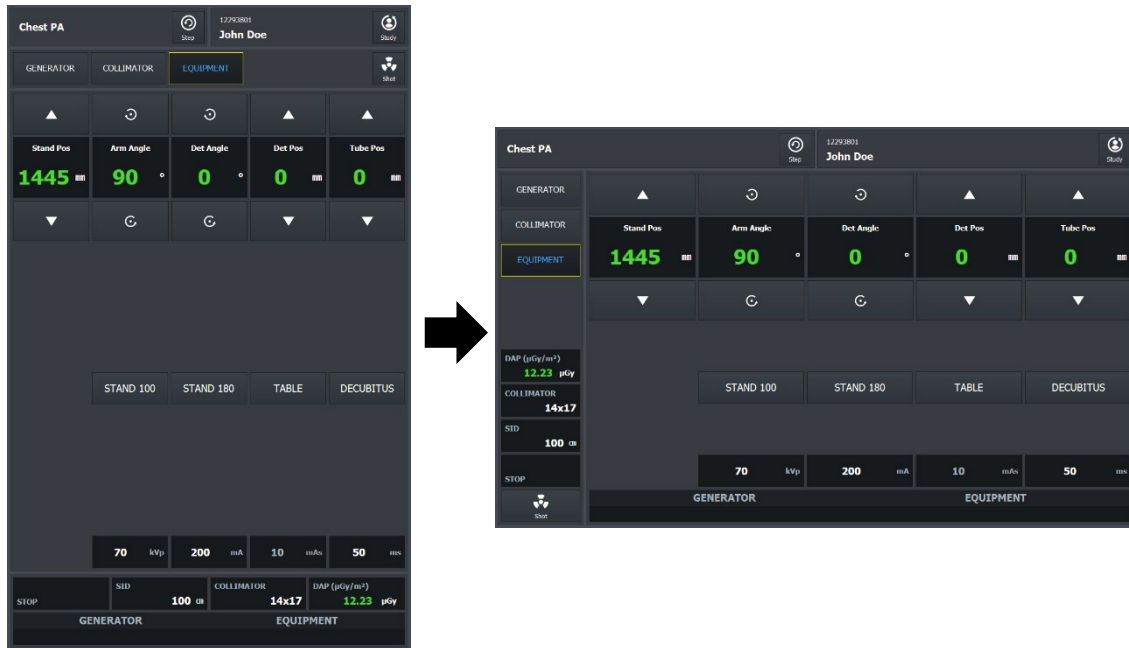
⑦ Shows the information of other equipment that have not been selected from ②.

- Shows the information of equipment at the bottom of the screen in case of selecting the generator.
- Shows the information of generator at the bottom of the screen in case of selecting the equipment.
- Shows the information of generator and equipment at the bottom of the screen in case of selecting the collimator.

## Screen Rotation

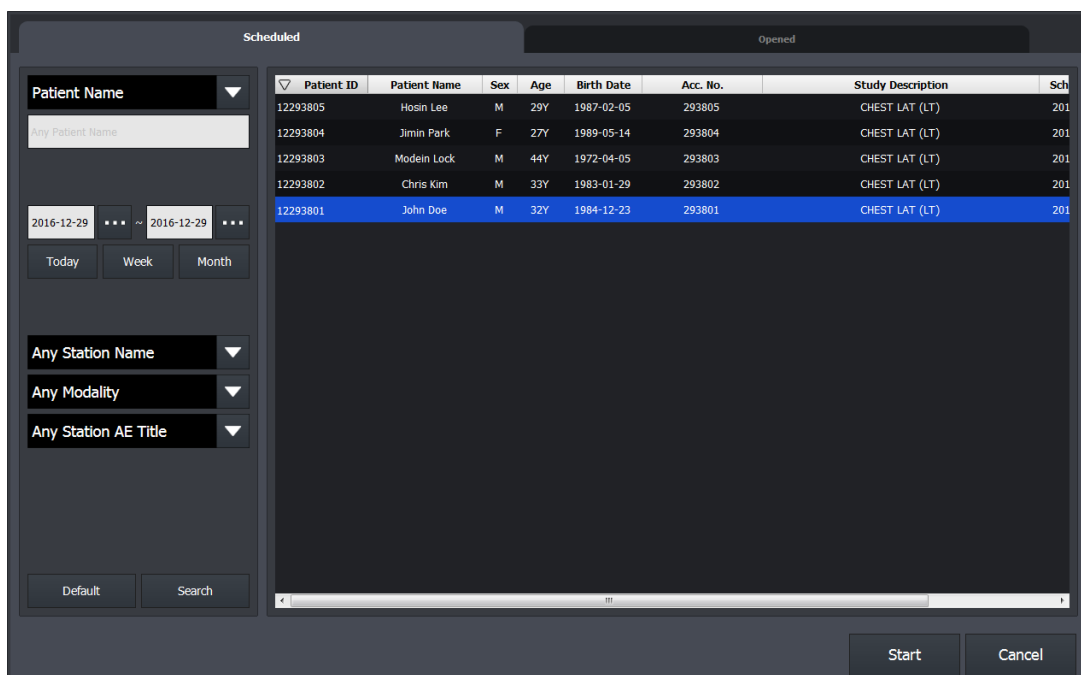
If U-ARM is integrated with the generator, the UI layout is changed when the arm's angle is rotated over 45°.

- Vertical → Horizontal
- Horizontal → Vertical

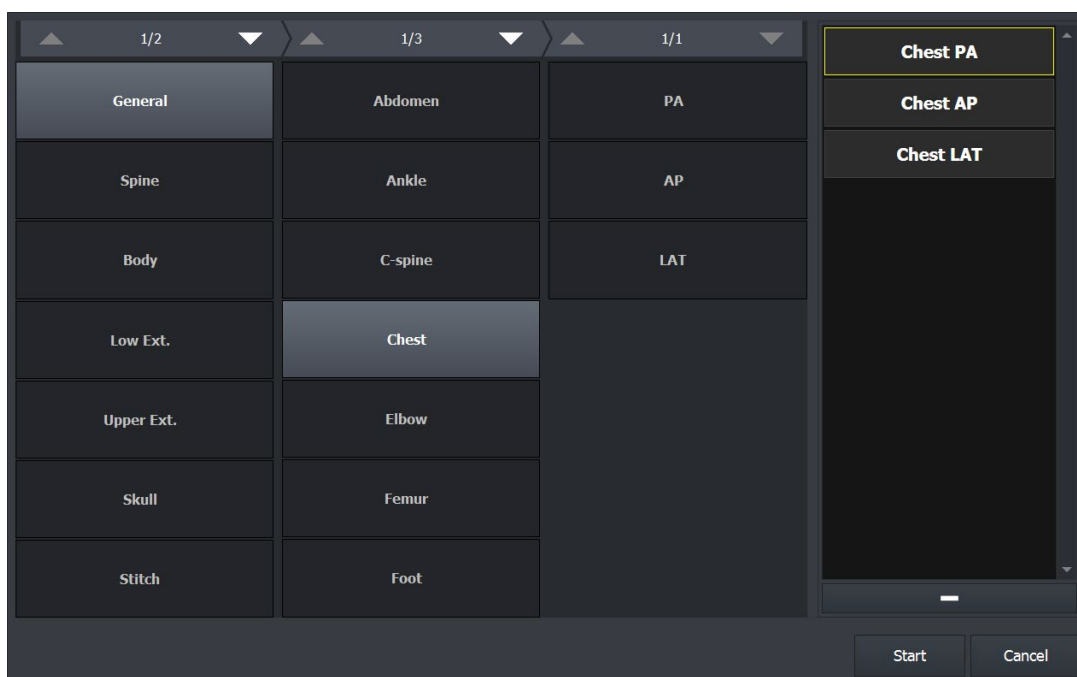


## 9.1.3 Sample Screen

### Searching Worklist / Selecting Study information

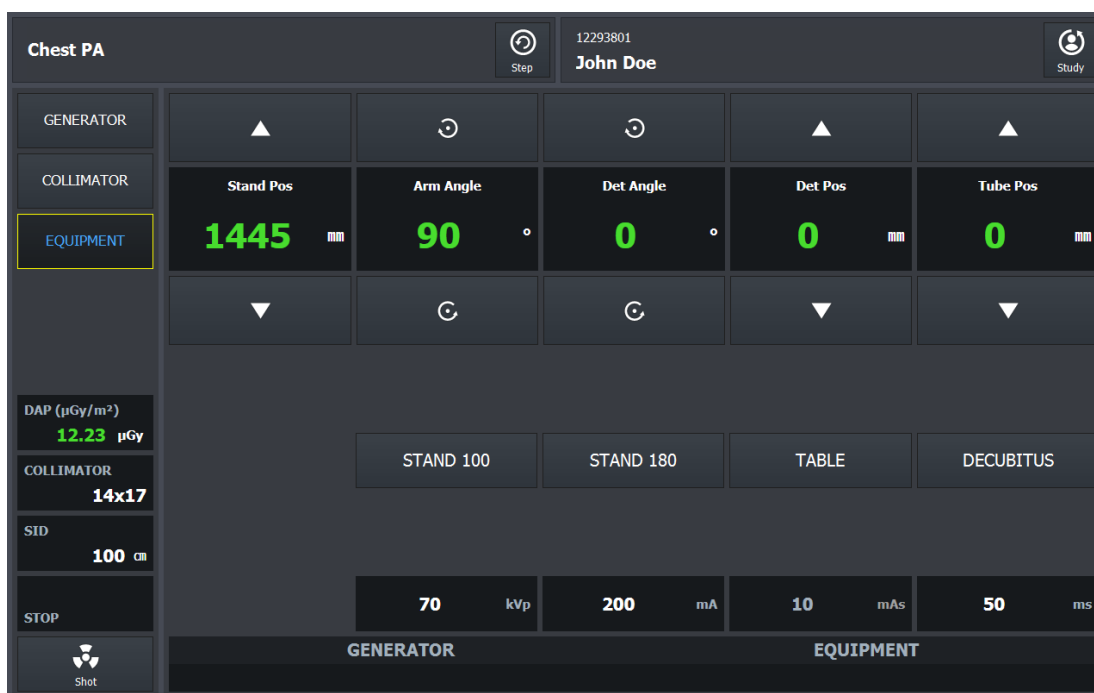


## Selecting / Changing Step



- When the equipment, generator, and collimator are all integrated with the viewer, their buttons are shown on the second monitor in order of generator → collimator → equipment.

## Selecting U-ARM



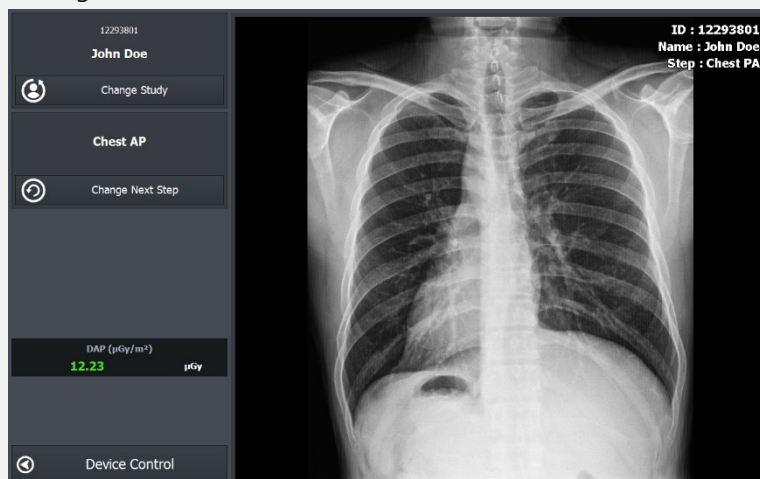
## Selecting Generator

Chest PA		12293801 John Doe		Study	
GENERATOR	▲	▲	▲	▲	
COLLIMATOR	70 kVp	200 mA	10 mAs	50 ms	
EQUIPMENT	▼	▼	▼	▼	
DAP ( $\mu\text{Gy}/\text{m}^2$ ) 12.23 $\mu\text{Gy}$	mAs mA/ms AEC				Small Large Den 0 HU 0% Reset Error
COLLIMATOR 14x17					
SID 100 cm					
STOP	Stand Pos 1445	Arm Angle 90°	Det Angle 0°	Det Pos 0	Tube Pos 0
Shot	GENERATOR		EQUIPMENT		

## Selecting Collimator

Chest PA		12293801 John Doe		Study	
GENERATOR	Collimator				
COLLIMATOR	8x10	10x12	12x10	11x14	14x17
EQUIPMENT	17 x 17				
	Filter				
	0 AL	1 AL 0.1Cu	1 AL 0.2Cu	1 AL	
DAP ( $\mu\text{Gy}/\text{m}^2$ ) 12.23 $\mu\text{Gy}$					
COLLIMATOR 14x17					
SID 100 cm					
STOP	Stand Pos 1445	Arm Angle 90°	Det Angle 0°	Det Pos 0	Tube Pos 0
Shot	GENERATOR		EQUIPMENT		

- The acquired image and study information are displayed on the second monitor in the following cases.
  - If using the second monitor function without integrating the generator, collimator and equipment.
  - After shooting each step of images while integrating the equipment normally.
  - Click the **Device Control** button to take the next images.
  - Click the **Change Study** or **Change Next Step** to change the study information or step which image is to be taken.



## 10. Revision History

Ver.	Date	Descriptions
1.1	2015-05-27	Initial Release
1.2	2015-06-02	(Updated) 7. Additional Function for Integration
1.3	2015-06-29	(Updated) 3.9 Poskom
1.5	2015-10-05	(Added) Error and Warning messages of each generator model (Added) Specification of the integrated generator model
84	2015-11-13	(Changed) Composition of the file name
85	2016-01-20	(Deleted) Contents related to the Dragon generator (Updated) Support functions of generator
85b14	2016-05-16	(Added) 3.10 DK Medical Solution (Added) 3.11 IDETEC
86b6	2016-09-06	(Added) 4.2 VCI (Added) 3.3 Sedecal (Added) 3.11 Quantum (Added) 5.2 VacuDap (Changed) Generator table of Sedecal_WM (Chnaged) UI images of generator, collimator, DAP, U-ARM (Deleted) Specifications of generator
86b8	2016-11-11	(Added) The connecting method of CPI generator (Changed) UI (User Interface) of the generators
86b11	2016-12-29	(Added) 6.1 SYFM (Changed) Function descriptions of Second Montor and its screen images
86b19	2017-05-11	(Changed) The connecting method and setup display of CPI generator
86b20	2017-06-12	(Added) 3.12 DIRA Generator (Added) Gidance on xml file for setting up generator linkage
86b20p4	2017-07-20	(Added) 3.13 HGHV Generator (Changed) xml file table for generator settings
86b21	2017-08-01	(Added) xml file items for generator settings
86b22	2017-09-12	(Added) 3.2.3/3.9.3 How to Set Generator in Procedure Manager in VXvue - Compatible firmware version of VacuTec DAP (Changed) 5.2 VacuTec - Specifications of CPI / DK Generator Procedure Manager
86b22p5	2017-12-07	(Removed) 3.2 CPI - 'CMP 200' item (Added) 5.3 DMC
	2018-01-11	(Added) CE 2460 mark to front cover (Changed) Changed the European agent address and contact information.
86b24	2018-03-09	(Added) Procedure Manager - Select Automatic Dose Mode (Added) SU4000 Firmware and SDK Compatibility Versions

<b>86b25</b>	2018-03-26	(Added) CPI Generator Settings – Sync option of membrane console and PC
<b>87</b>	2018-09-03	(Changed) CPI INDICO 100 Generator connection settings (Changed) POSKOM generator connection settings / Calibration data file application method
<b>1.0.1.0</b>	2019-02-15	(Removed) Integration of Quantum Generator (Added) Integration of POSKOM Generator (Changed) VCI → Ralco (with VCI) and description of VCI (Changed) U-Arm → Equipment and description of VDI
<b>1.0.1.3</b>	2019-08-28	(Added) Integration of Anthem (DEL) Generator (Added) Integration of CPI.CMP150 Generator (Added) Integration of SYFM Generator (Added) Integration of Ecoray Generator (Added) Integration of Sedecal.SHFR Generator (Added) Integration of GXR 52 Generator (Added) Integration of Spellman.Zeus Generator (Added) Information related to integration of VCI and CS (Added) Integration of RALCO R225ACS Collimator (Added) Information related to integration of VBI and BS (Added) Integration of Riello DVR500 Battery (Added) Information related to integration of VEI and ES (Added) Integration of Roesys X-twin Rail Equipment (Removed) RALCO with VCI (Changed) VDI -> VEI
<b>1.0.1.4</b>	2019-11-18	(Added) Integration of Spellman.HFE (Added) Integration of CPI.INDICO.IQ (Changed) Ralco.255ACS → Ralco.R225.ACS (Changed) How to Use X-twin (Rail) in VXvue
<b>1.0.2.0</b>	2020-04-13	(Added) Integration of IBA Kerma X DAP (Changed) Integration of Sedecal Generator (Changed) Integration of Spellman.HFe Generator (Added) Integration of Varex.Optica Collimator
<b>1.0.2.2</b>	2020-07-02	(Added) Integration of IBIS Generator
<b>1.0.2.3</b>	2020-09-24	(Changed) 3. Generator (Changed) 4. Collimator (Changed) 7. Equipment
<b>1.0.2.4</b>	2020-10-26	(Changed) 3.1 GXR 68
<b>1.0.2.5</b>	2020-12-02	(Added) 8. System (Added) Product plant address
<b>1.0.2.6</b>	2021-02-01	(Added) 3.24 SMAM Revision (Changed) 8.1 SG Healthcare Jumong Mobile (Added) 8.2 GR10X

<b>1.0.3.0</b>	2021-07-12	(Added and Changed) 3.1 Common Settings for Generator
		(Added) 4.1 Common Settings for Collimator
		(Added) 5.1 Common Settings for Battery(UPS)
		(Added) 6.1 Common Settings for DAP
		(Added and Changed) 8.1 Common Settings for System
		(Changed) 8.2 SG.Healthcare Jumong Mobile
		(Changed) 8.3 GR10X
<b>1.0.4</b>	2022-03-17	(Added) References on the cover
		(Changed) 6.3 VacuTec
<b>1.0.5</b>	2022-07-04	(Changed) 3.21 SPELLMAN.HFE
		(Added) 8.4 Micro-X Rover
<b>1.0.6</b>	2022-12-29	(Changed) 3.20 SPELLMAN.ZEUS
		(Changed) 3.21 SPELLMAN.HFE
		(Added) 3.26 POWERSITE.PSG.HR
<b>1.0.7</b>	2023-07-25	Changed) 4.1.2 How to Set Collimator from VXvue
		Added) 8.5 Viewworks (System)

# VIEWWORKS

---

**Viewworks Co., Ltd.****Headquarter**

41-3, Burim-ro 170beon-gil, Dongan-gu, Anyang-si,  
Gyeonggi-do, 14055 Republic of Korea  
Telephone: +82-70-7011-6161  
Fax: +82-31-386-8631  
Homepage: <http://www.viewworks.com>

**Hwaseong Site**

25-7, Jeongnamsandan 2-gil, Jeongnam-myeon, Hwaseong-si,  
Gyeonggi-do, 18514 Republic of Korea  
Telephone: +82-70-7011-6161  
Homepage: <http://www.viewworks.com>

**European representative: Obelis s.a**

Bd. Général Wahis 53  
1030 Brussels, BELGIUM  
Tel: +(32) 2.732.59.54  
Fax: +(32) 2.732.60.03  
E-mail: [mail@obelis.net](mailto:mail@obelis.net)

