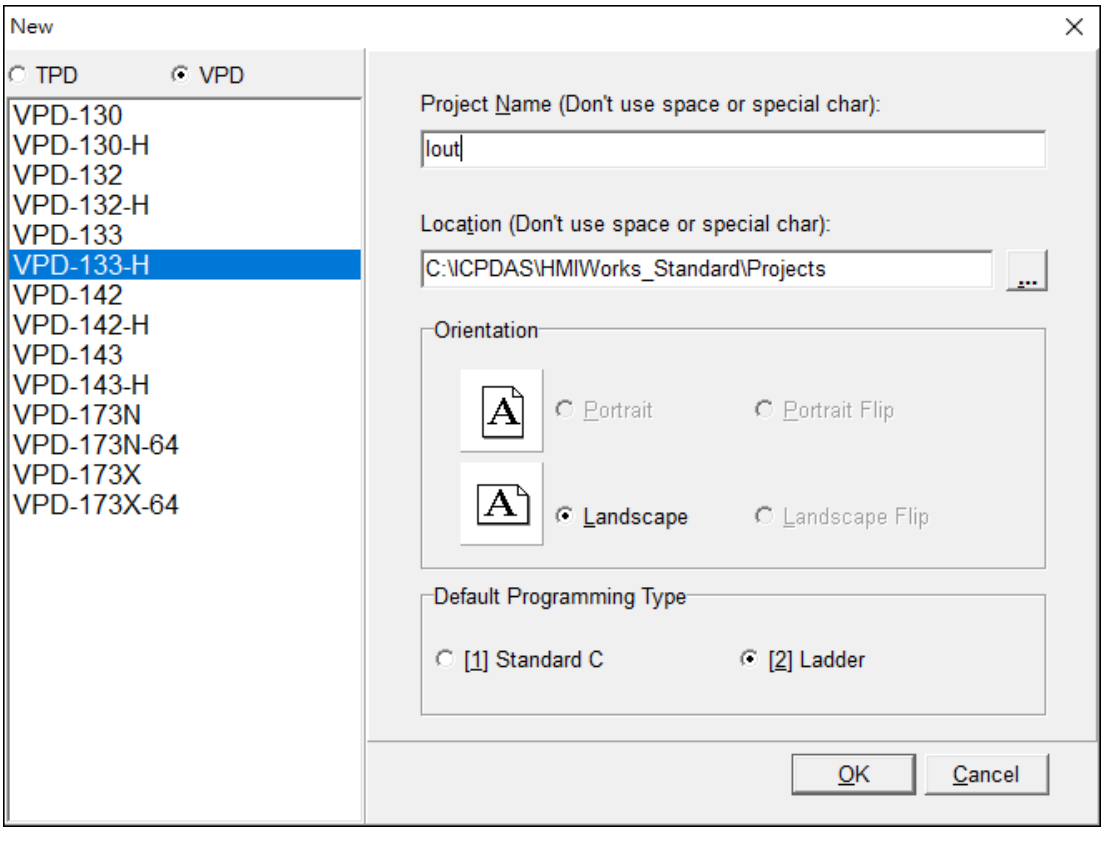
Classification	☐ tDS/tGW/tSH ☐ PETL/tET/tPET/ET-2200 ☐ DS/PDS/PPDS ☐ tM-752N ☐ I/O Card ☐ VXC Card ☑ TouchPAD/HMIWorks ☐ VxComm				
Author	Tammy	**Date**	2018-11-19	**No.**	FAQ031

Q: How to use analog I/O function of XV-board with VPD products?

A: HMIWorks has built-in support for XV-board with easy integration. The **"Engineering Unit"** data format is forced for AI/AO by default. Therefore, value 0 - 10,000 is mapped to 0 - 10V and value 0 - 20,000 is mapped to 0 - 20 mA for example. Refer the following procedure to create a sample program of channel 0 current output range 0 to 20 mA. Here, we will use the VPD-133-H with XV307 as an example.

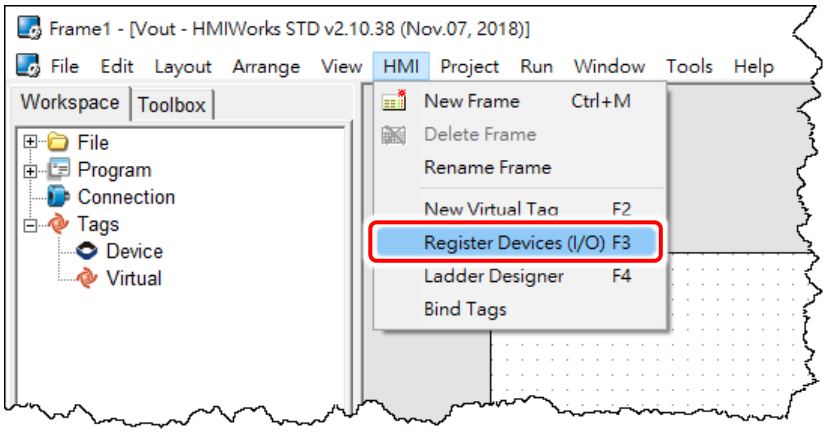
Step 1: Launch the HMIWorks Standard software. And based on your TouchPAD device (e.g., VPD-133-H), create a new project. Here, we will use the **"[2] Ladder"** mode as an example.



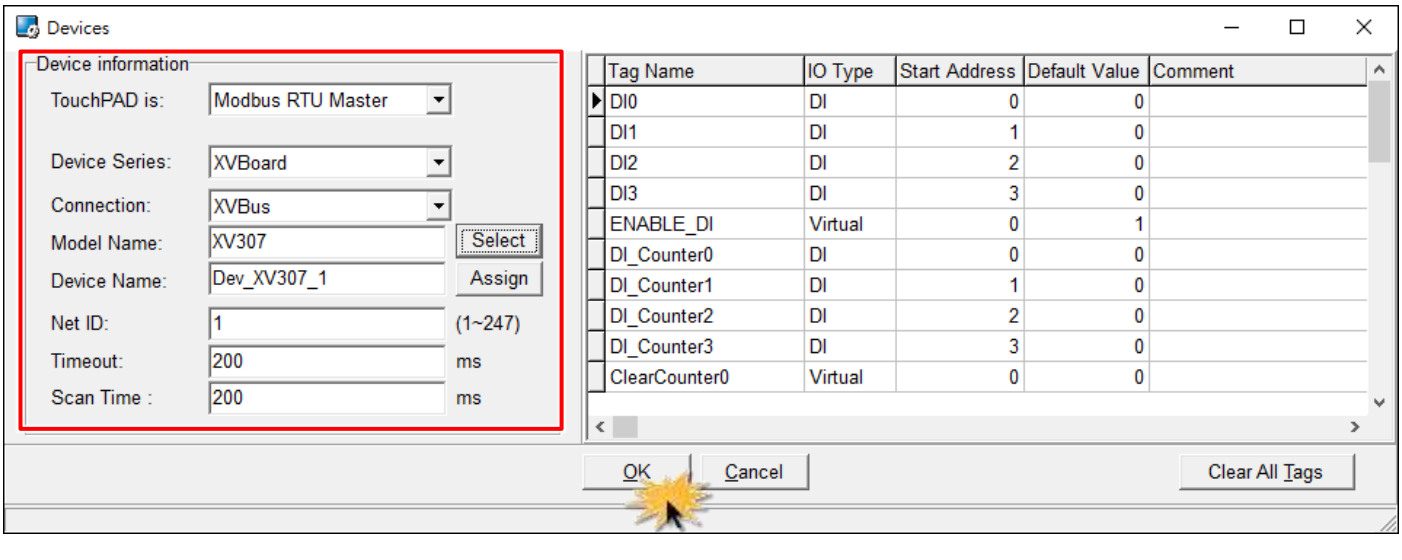
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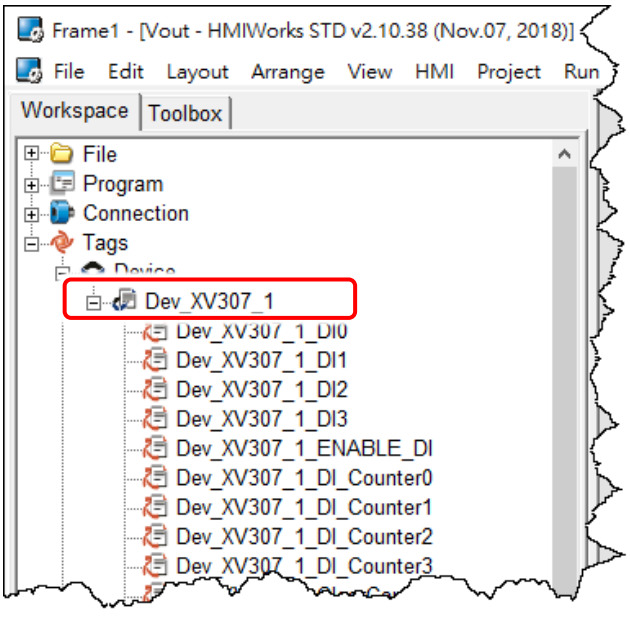
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Step 2: Press **<F3>** key or click the "**Register Devices (I/O) F3**" option from the "**HMI**" menu to open the "**Devices**" window to register the XV-board module (e.g., XV307).



Step 3: Step by step specify or fill each field and click the **"OK"** button to import tags.





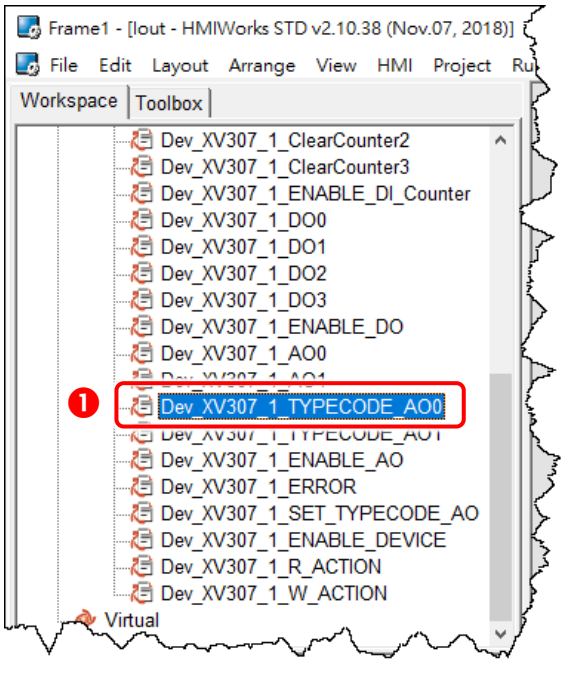
Step 4: The creation of the **"Dev_XV307_1"** device is now complete.

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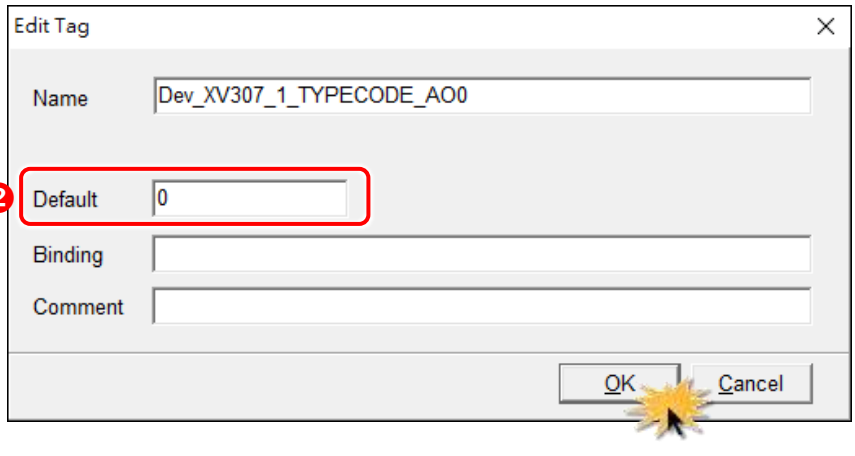
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Step 5: Modify the **type code of the Analog Channel** (e.g., AO0) depending on your needs. For detailed information about the type code of Analog I/O range, refer to Appendices: Analog I/O Type Code Supported Table.

1. Double click on the **"Dev_XV307_1_TYPECODE_AO0"** tag to open the **"Edit Tag"** box.



2. Modify the type code in the **"Default"** field and click the **"OK"** button. For example, refer to XV303/XV-307/XV310: Analog Output Range to set the **Default to 0 (0~20 mA)**.

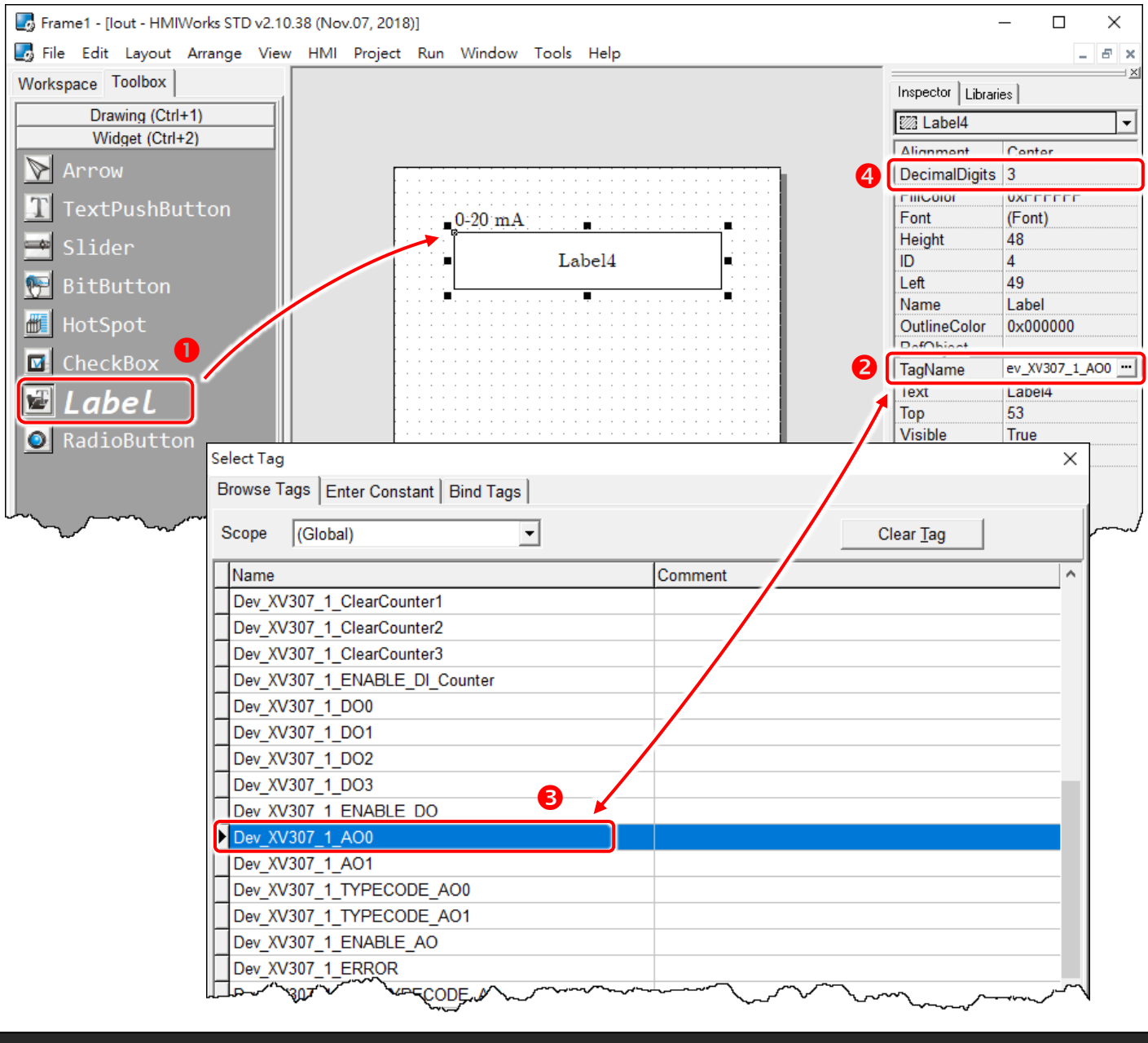


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Step 6: Create a component **“Label”** to display the current value being output.

1. Click the **"Label"** object in the **“Widget”** section of the "**Toolbox**" pane, and then click the desired position on the design frame to place the widget. Change the widget size as required.
2. Click the **“…”** button from the **TagName** field in the Inspector to open the “**Select Tag**” window.
3. Double click on the tag Name (e.g., Dev_XV307_1_AO0) you want to associate with the **Label** object.
4. Set the number of digits of the fractional part in the **“DecimalDigits”** property.
   Since the **"Engineering Unit"** data format is used, so the AI/AO tag is 1000 times to the real value. Therefore, **we set 3 in the DecimalDigits** property for showing correct value **x.xxx** on the Label widget.

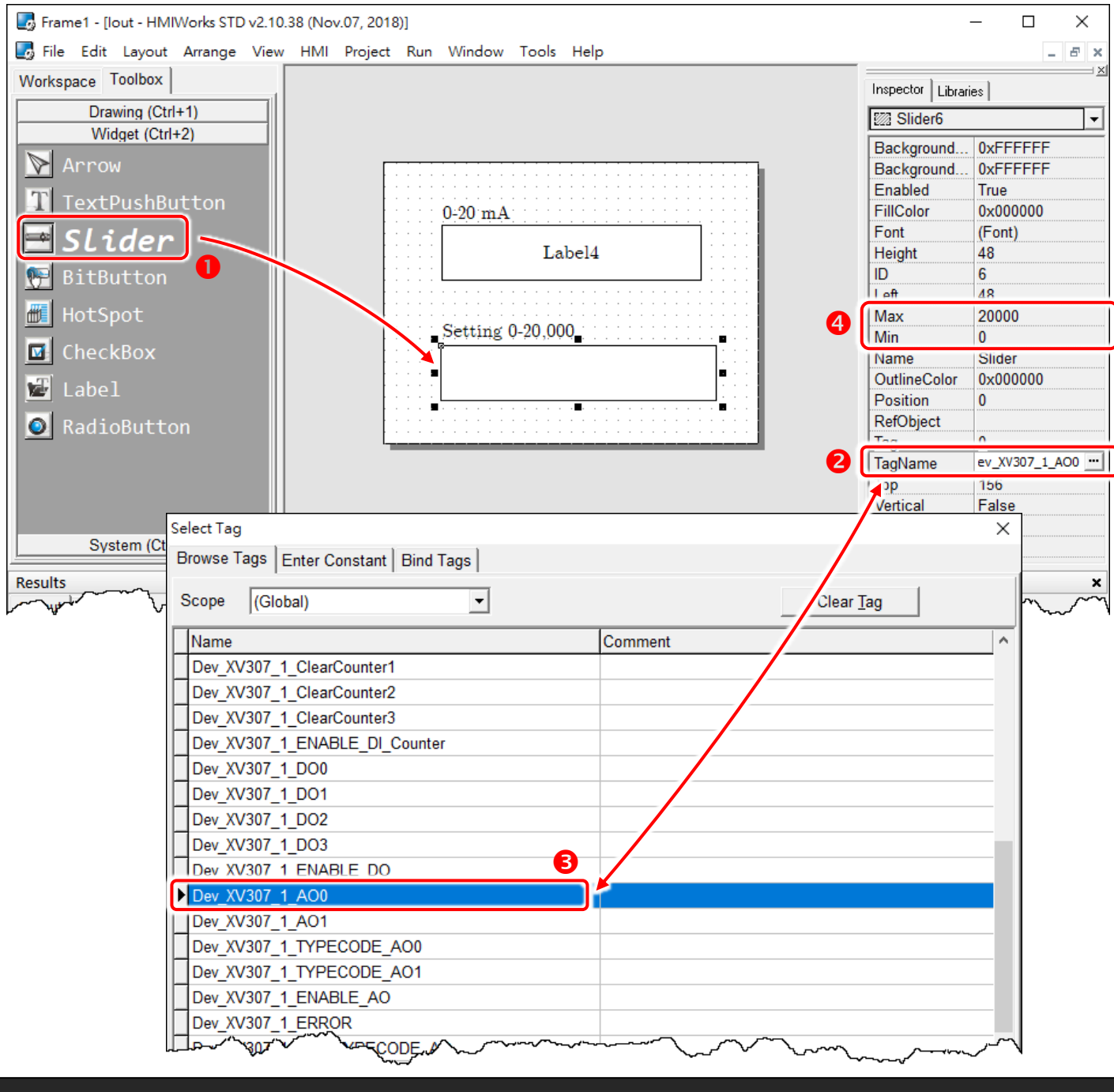


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Step 7: Create a component **“Slider”** to set the current value of the output.

1. Click the **"Slider"** object in the **“Widget”** section of the "**Toolbox**" pane, and then click the desired position on the design frame to place the widget. Change the widget size as required.
2. Click the **“…”** button from the **TagName** field in the Inspector to open the “**Select Tag**” window.
3. Double click on the tag Name (e.g., Dev_XV307_1_AO0) you want to associate with the **Slider** object.
4. Set the maximum and minimum current range in the **“Max”** and **“Min”** fields. For example, Max = 20000 and Min = 0 that matches the AI/AO type code in **"Engineering Unit"** data format.



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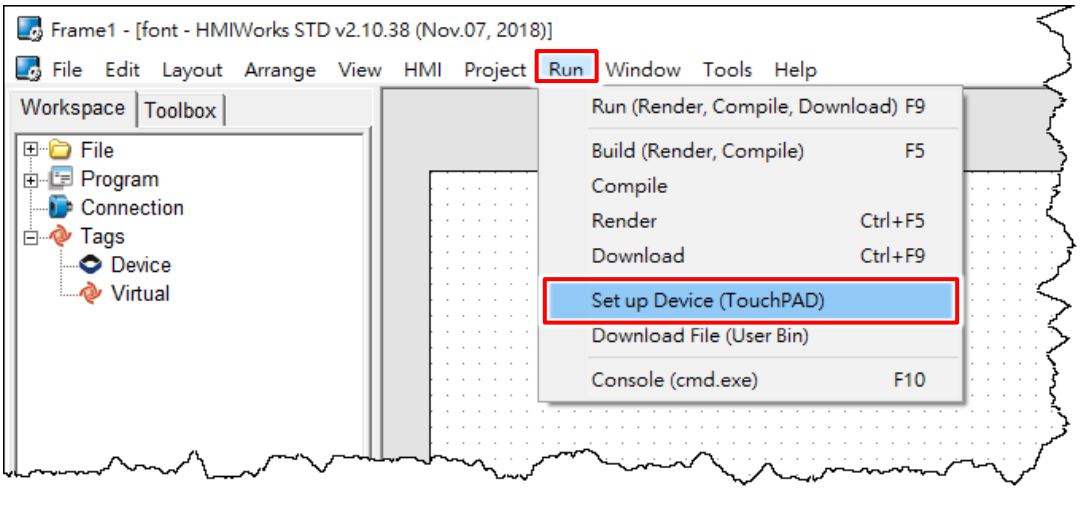
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Step 8: Setup Device.

The setup device methods depends on the type of TouchPAD device and download methods, refer to the Section 3.4 Downloading Methods for TouchPAD of the TouchPAD Hardware User Manual for more detailed information.

In this example, we use the VPD-133-H device to connect the Host PC via USB wiring and turn the rotary switch to position 9 mode (USB update mode) then reboot TouchPAD device.

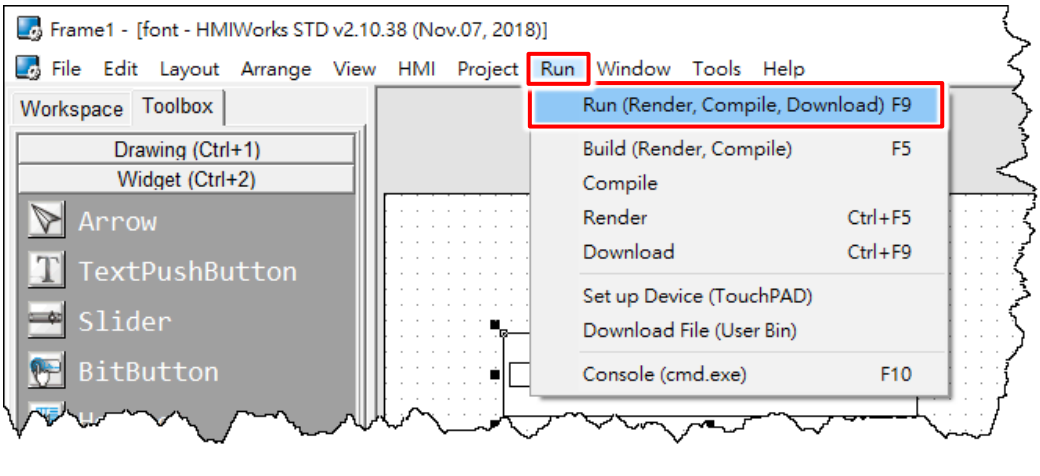
Click the **"Set up Device (TouchPAD)"** option from the **"Run"** menu to select the USB download interface.



Step 9: Compiling and Downloading to Run.

The downloading program method to the TouchPAD depends on the type of TouchPAD device, refer to the Section 3.4 Downloading Methods for TouchPAD of the TouchPAD Hardware User Manual for more detailed information.

Click the **"Run (Render, Compile, Download) F9"** option from the **"Run"** menu, or press **<F9>** key. Once the download is complete, set the rotary switch to position 0 (Run mode) and reboot TouchPAD device.



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Appendices: Analog I/O Type Code Supported Table

User can inquire the following table to set analog input or output range, each multi-function expansion board has the different analog input or output range. For detailed information refer to XV-board hardware user manual. **Note:** The **"Engineering Unit"** data format is used for AI/AO.

XV303/XV-307/XV310: Analog Output Range

Type Code	Range	Data Format	Minimum	Maximum
00	+0 ~ +20 mA	**Engineering**	**0**	**+20000**
		Hexadecimal	0000h	FFFFh
01	+4 ~ +20 mA	**Engineering**	**+4000**	**+20000**
		Hexadecimal	0000h	FFFFh
02	+0 ~ +10 V	**Engineering**	**0**	**+10000**
		Hexadecimal	0000h	FFFFh
03	-10 ~ +10 V	**Engineering**	**-10000**	**+10000**
		Hexadecimal	8000h	7FFFh
04	+0 ~ +5 V	**Engineering**	**0**	**+5000**
		Hexadecimal	0000h	FFFFh
05	-5 ~ +5 V	**Engineering**	**-5000**	**+5000**
		Hexadecimal	8000h	7FFFh

XV306/XV308/XV310: Analog Input Range

Type Code	Range	Data Format	Minimum	Maximum	Open Wire (Broken Wire)
05	-2.5 ~ +2.5 V	**Engineering**	**-25000**	**+25000**	-
		Hexadecimal	8000h	7FFFh	-
06	-20 ~ +20 mA	**Engineering**	**-20000**	**+20000**	-
		Hexadecimal	8000h	7FFFh	-
08	-10 ~ +10 V	**Engineering**	**-10000**	**+10000**	-
		Hexadecimal	8000h	7FFFh	-
09	-5 ~ +5 V	**Engineering**	**-5000**	**+5000**	-
		Hexadecimal	8000h	7FFFh	-
0A	-1 ~ +1 V	**Engineering**	**-1000**	**+1000**	-
		Hexadecimal	8000h	7FFFh	-
0D	-20 ~ +20 mA	**Engineering**	**-20000**	**+20000**	-
		Hexadecimal	8000h	7FFFh	-
1A	+0 ~ +20 mA	**Engineering**	**0**	**+20000**	-
		Hexadecimal	0	FFFFh	-
1D	XV306/308: +4 ~ +20 mA (*2) XV310: +4 ~ +20 mA (*3)	**Engineering**	**+4000**	**+20000**	0
		Hexadecimal	1999h	7FFFh	0000

(*2/*3): Only the 4 ~ 20 mA of AI supports open or broken wire detection

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