# USER GUIDE | UG:602

# **Power System Configurator User Guide**



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# Introduction

The Vicor Power System Configurator (PSC) software interface enables control and monitoring of select Vicor power modules from a Host PC. Connected to the PMBus<sup>®</sup> interface of power modules by a compatible Vicor PMBus-USB Adapter, the GUI allows users to read and write into the configuration registers and to observe input and output telemetry, monitor faults and obtain other device information.

Download the software and purchase a compatible PMBus-USB Adapter at the Vicor website.

Compatible Dongle	Status	User Guide
I2C-ADAPTER-A04	Released	UG:901 PMBus Interface and Accessories User Guide

# Installing the PSC Software

#### **Uninstall Previous Versions**

Note: if a previous version of PSC is <u>not</u> already installed, skip this step.

Prior to installation, check for previous versions of Power System Configurator (PSC) that may already be installed. If any previous versions of PSC are installed, remove them before installing the new version.

• Go into the Add or Remove Programs window. If a previous version of PSC is installed, uninstall it.

△ Hama	Apps & features	
W Home	Apps & leatures	
Find a setting	Choose where to get apps	Related settings
Apps	Installing apps only from Windows Store helps protect your device.	Programs and Features
	Anywhere $\checkmark$	Have a question?
E Apps & features		Changing startup appr
15 Default apps	Apps & features	Troubleshooting Microsoft Store apps
Щ Offline maps	Optional features	Uninstalling apps
Anos for websites	App execution aliases	Updating apps
□ Video playback	Search, sort, and filter by drive. If you would like to uninstall or move an app, select it from the list.	Get help
☐ Startup	Sort by: Name V Filter by: All drives V	-
	PowerSystemConfigurator 36.6 MB 7/24/2020	

If there are no other versions in the window, continue to the next step, *Install PSC: Run the Set Up Wizard*.

**Figure 1** Add or remove programs window in Windows



#### Install PSC: Run Set Up Wizard

Note: if a previous version of PSC is already installed, uninstall it first.

Run the PowerSystemConfigurator.msi file; this will open the set up wizard.

#### • Click **<u>Next</u> >** to begin the installation.





Specify the folder address for installation, then select the user group that will have access to the software on this machine.

#### • Click <u>Next</u> > to continue.

<b>Figure 3</b> Select installation	PowerSystemConfigurator	- 🗆 X
location and user(s)	Select Installation Folder	ICOR
	The installer will install PowerSystemConfigurator to the following fold To install in this folder, click "Next". To install to a different folder, enter "Browse".	der. Prit below or dick
	Folder. C\Program Files (x86)\Vicor Corporation\PowerSystemConfig	Browse
	Install PowerSystemConfigurator for yourself, or for anyone who use © Everyone	es this computer:
	O Justme	Cancel

• Click <u>Next</u> > to confirm installation.

# Figure 4 Confirm installation

Confirm Installation				
		VI	CO	R
he installer is ready to install PowerS	ystemConfigura	ator on your comp	uter.	
lick "Next" to start the installation.				
				_



## Run Set Up Wizard (cont.)

Wait while installation commences.



Click **<u>C</u>lose** when installation is complete.

The program will now be accessible from the desktop or Start menu.





#### Install Microsoft .NET Framework (if applicable)

PSC requires Microsoft .NET framework v4.5.2 or later. PSC will determine if .NET Framework is installed and if the version is compatible with the PSC software.

- Open PSC from the desktop alias or Start menu icon.
   If .NET Framework is not installed, PSC will direct the user to the correct website to download and install.
- Download the latest version of .NET Framework from the Microsoft website: <u>https://dotnet.microsoft.com/download/dotnet-framework</u>



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	Internet and	2017-08-05			
	ALL FRAMEWORK A.D.Z	2016-08-02			
	terre and the second seco	1004 # 14 M			

• Run the downloaded .exe to install .NET Framework.

Figure 8	
Install	c 🖩 Microsoft .NET Framework - 🗆 🗙
.NET Framework	JICT Framework 4.9 Setup Please wait while the JIET Framework is being installed.
	Download progress:
	All files were downloaded successfully.
	Instalation progress:

Wait while installation commences.

• Click **<u>F</u>inish** when installation is complete.

## **Quick Start**

#### Launch the Vicor Power System Configurator (PSC) Application

Note: PSC requires Microsoft .NET Framework.

If it is not installed, turn to the Install Microsoft .NET Framework section of this user guide.

• Open the Vicor PSC application from the desktop alias or search "power system configurator" in the Start menu.





#### **Connect PSC to Vicor Hardware**

The PSC application will attempt to connect to Vicor power system hardware upon launch. To connect compatible hardware, use the PMBus-USB Adapter.

# Figure 10

Start-up sequence: connecting power system hardware

	VICO	)R	
Power S	System O	Configurat	ator
0			0

If no devices are connected, PSC allows users to select a virtual device.

check to make sure that devices are powere computer, and no two devi	d on, dongles are connected to de ce addresses are the same.	vices and
	Ø	
Select and configure from a list of virtual devices	Rescan for connected devices	
SELECT & CONFIGURE	RESCAN	_

#### Figure 11

Selecting a virtual device when no devices are connected



#### **Automatic Updates**

Note: While The PSC application does not require an internet connection for normal operation, an active internet connection is required for successful automatic application updates. Manual updates are also possible by running the latest executable from the <u>Vicor website</u> offline on the local machine.

At launch, the PSC application will attempt to check the Vicor server for any necessary updates to the software. If a new update has been detected, a prompt will appear as shown in Figure 12, alerting the user. Updates may also be checked manually by clicking the **UPDATE** button to the right of the **SAVE** button on the top left of the PSC window, as shown in Figure 18.

• Click the **UPDATE NOW** button to proceed with the update.



#### **NDA Device Passkey**

Certain devices supported in PSC may only be accessed with a provided passkey from Vicor. Enter this passkey at the "Select a virtual device" prompt as shown in Figure 13. The passkey is not needed when connecting to a physical device connected to a Host PC, only when configuring a virtual device. Upon entry of the passkey, the NDA device will stay in the virtual device list through application exit and re-launch.

Note: Passkeys may be cleared and need re-entry during PSC updates of version number X and Y, not Z (i.e., version X.Y.Z). The automatic update prompt will display a warning when NDA passkeys will be cleared with the new update as shown in Figure 12.



*Figure 13* Select a virtual device prompt

#### Select and Configure a Virtual Device

A "virtual device" refers to an emulated version of a device that can be used to explore all configuration settings while no hardware is connected to the computer. Virtual devices have no telemetry or fault status monitoring capabilities.

• Choose a virtual device from the available options; PI3021 shown below.

Figure 14

Selecting a virtual device from the available options



After selecting the device, configuration tabs will be accessible in the settings pane (center) of the PSC screen.

Tabs in this example:

- Device
- I-Sense
- Telemetry
- Control Loop
- Fault

All of these tabs are accessible in virtual mode and the fields can be altered without needing a physical device connected to the computer.

# Figure 15

Info section of Device tab

	Device I-Sense Telemetry Control Loop Fault	
Devices      Configure new device P13021  0x4C	Info PMBus I2C Manufacturer Information Firmulae ID 47 Firmulae rec.?	READ ALL Vin 47,25V Vour 0,500 In 0,304 Iour 9A Pin 16W Pour 3W Town 33V
	Lock time	Status Summary O



#### **Configure a Connected Device**

Note: To connect compatible hardware, use the PMBus-USB Adapter.

If the PSC application successfully connects to Vicor power system hardware during start up, it will show the device name and address on the device sidebar (left side).

# Figure 16

PMBus<sup>®</sup> section of Device tab for a real PI3021 with address 0x4C

	Orvice I-Sense Telemetry Control Loop Fault		
	Info PMBus I2C		
Devices Ø		SAVE TAB	Telemetry Summary VIN 47.25V VOUT 0.898V
P13021 0x4C	Input Overpower warning Tosw		IIN 0.38A Iout 5.5A PIN 18W Pout 4W TEMP 36°C
	Cutput Vout Transition command rate 0.5% [2mV/ps]		Status Summary 🔘 View fault status
	Temperature Overstampeature wearing 1055C		

The settings pane of the PSC window (center) shows the fixed and variable configuration parameters of the device, and the telemetry summary sidebar (right side) shows the system telemetry information along with the system warnings and faults.

#### Device Configuration Tabs

When PSC detects Vicor power system hardware, it automatically reads all the configuration parameters from the hardware attached through the PMBus-USB Adapter and updates them in the appropriate fields within different configuration tabs. Each compatible Vicor device connected to PSC will display tabs for viewing and customizing its settings.

The tabs and sub-tabs shown here are specific to the PI3021 device. Other devices may show different tabs and options.

	Device I-Sense Teleme	ry Control Loop Fault			
	Plot Configure Input 0	Configure Output Configure Thermal			
Devices O Configure new device	► II II	Update rate 11	Timebase 10	Toggle logging 🖬 Log to file 🚇	Telemetry Summary Vin 47.25V Vour 0.90
PI3021 0x4C		Vin		Vout	IIN 0.38A IOUT 6A
	47.35 () arr3 () arr3	225 . 325	03 03 03 05 05 05 05 05 05 05 05 05 05 05 05 05	16s 26s	Toxin 37°C Status Summary () View fault status

#### Figure 17

Plot section of Telemetry tab for PI3021 shows charts of voltage and current for input and output

#### **Saving Customized Settings**

PSC will show pre-set hardware configuration parameters in appropriate fields within the settings pane; it is also possible to save custom settings into power system memory and into a file on the local drive of a computer.

#### Writing to Hardware Memory

Write to <u>volatile</u> memory: Values, buttons, and switches will perform calculations altering the configuration of the power system. These changes are <u>temporarily saved</u> into the volatile memory. Do this by either:

- Pressing **Enter** on the keyboard.
- Clicking **Apply** where shown in a sub-tab.

Write to <u>non-volatile</u> memory: Changes made to the power system's volatile memory may be <u>permanently saved</u> into the non-volatile memory by:

• Clicking the **SAVE TAB** button. This button only saves the parameters related to the tab being viewed.

Other tabs are not affected; if applicable, each will have its own **SAVE TAB** button.

• Clicking the **SAVE** button on the top left of the PSC window and choosing the **DEVICE** option. This will save all configuration parameters across all tabs.

Important note: Not all values shown in the settings pane will be saved to the power system, e.g., component values and the fault status. Refer to saving to local computer file section to store these values.

>	Plot Configure Input Configure Output Configure Thermal		
Devices O	Configure Isense tab before proceeding	SAVE TAB	Telemetry Summary
Configure new device	Output current		lin 0.38A lout 6A
P13021 0x4C	Design max Offset		PIN 18W Pour 8W
	253A OA		TEMP 37.5*C
	APPLY RESTORE TO DEFAULT		Status Summary O

# Saving to the PC File System

Saving to a file: Configuration parameters in all tabs can also be saved to a file on the local drive of computer by:

Clicking the SAVE button on the top left of the PSC window and choosing the FILE option.

**Restoring saved settings from PC file system:** A saved configuration file can also be opened and restored by:

 Clicking on the OPEN button next to the SAVE button on the top left of the main screen, as shown in Figure 18.

Important Note: When a saved configuration file is restored, the PSC application will <u>immediately</u> load the configuration parameters into the system's volatile memory.

#### Figure 18

Saving and opening customized settings on a local computer or saving to non-volatile power system memory

# **Example Configuration: Vicor PI3021 CTO**

Note: The tabs and sub-tabs shown in this quick start guide are specific to the PI3021 device. Other devices may have the same, similar or completely different tabs not discussed in this guide.

When the PSC application successfully connects to the PI3021 CTO device through the PMBus-USB Adapter during start up, the device name (PI3021) and address (0x4C) will appear on the device sidebar (left side) of the application window.

	Device I-Sense Telemetry Control Loop Fault		
	Info PMBus I2C		
Devices Ø		SAVE TAB	Telemetry Summary
Pi3021 0x4C	Input Oversower warring ToSW		Inn 0.38A Iour 5.5A Pinn 18W Pour 4W Temp 36°C
	Output Vout Transition command rate 0.9V 2mM/pt		Status Summary Ø View fault status
	Temperature Oversmoreature washing NoSYC		

The settings pane of the PSC window (center) shows the fixed and variable configuration parameters of the device, and the telemetry summary sidebar (right side) shows the system telemetry information along with the system warnings and faults.

#### **Device Configuration Tabs: Device**

General information and basic parameters (Figures 15, 19, 20). A **READ ALL** button can be found in the Info section. This will refresh the selected device as if PSC were just re-launched.

- Info: general manufacturer and firmware information (Figure 15 above)
- PMBus: determining output voltage level, transition rate, overpower and overtemperature warnings (Figure 19 above)
- I2C: sending individual commands on the I<sup>2</sup>C bus to the hardware (Figure 20 below)



#### **Figure 19** PMBus<sup>®</sup> section of Device tab for a real PI3021

TOF à real Pl



#### **Device Configuration Tabs: I-Sense**

Use to adjust all the output-current-sensing parameters (Figure 21).





## **Device Configuration Tabs: Telemetry**

Use to take measurements and configurations for input voltage, output voltage and thermal settings (Figures 22 - 24).

- Plot: charts of voltage, current, power and temperature (Figure 22)
- Configure: configure measurements of voltage and current (Figure 23)
- Thermal: use to modify thermal configuration (Figure 24)











# Figure 24

Configure Thermal section of Telemetry tab

>	Plot Configure Input Configure Output Configure Thermal	
Devices O Configure new device P13021 0x4C	Thermal input	Теlemetry Summary Vin: 47.25V Vour 0.898V In: 0.38A Ioor 6A Рин 18W Роил 8W Теми 37.5°C
	Three Using Offset semperature IDM/K/V No Nes Offset	View fault status

# Device Configuration Tabs: Control Loop

Use to adjust the control loop and compensation network parameters (Figures 25 and 26).

- System Configuration: example powertrain set-up selection with inputs for board PDN (Figure 25)
- Loop Compensation: SPICE output of system configuration adjusted by loop parameters (Figure 26)



	System Configuration Loop Compensation	
Devices ()	PRM2010560E60E0700 V 1Qey V VTM340856020280100 V 1Qey V	Telemetry Summary
Configure new device	On part number selection, values in I-Sense tab may change. Refer for adjustments.	Vev 47.25V Vour 0.898V
PI3021 0x4C		In 0.38A IOUT 6A
		PIN 18W Pour 6W
	Input Voltage (40V V) Output voltage (0.8V V) Powee/Current (120A V)	ТЕМР 37.5*С
	10pH 72μΩ 5pH 10μΩ	Status Summary 🔘
		View fault status
	4000 22.00 Cm	
	[ (riph vonph	





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#### **Device Configuration Tabs: Fault**

Fault monitoring and related input/output voltage and current configurations, can all be set and adjusted in the Fault tab (Figures 27 – 29).

**Figure 27** Status section of Fault tab

	Device I-Sense Te	lemetry Control Loop			
	Status Configure In	put Configure Output			
Devices  Configure new device	CLEAR FAULTS	Shutdown system on fault shutdown delay	Startup Clear fault retry attempts shutdown latch	SAVE TAB	Telemetry Summary Viv 47.25V Vour 0.898
					PIN 18W POUT 3W
	Fault groups	Pin check	Input sense	Status MFR specific	ТЕМР 119.5*С
	Supplies	Vsense +	VR enable	PRM not started	
	GPIOs	Vsense +	ViO enable	Pin check flag	Status Summary 🔘
	• PWM	lout sense +	Input overvoltage	A Input power warning	View fault status
	VR VIO enable	lout sense -	Input undervoltage	PRM faulted	Input power warning
	Vout lout sense	VOHS	Input overcurrent		A Temperature fault or
	Vin lin sense	VPHS	PWM input overvoltage		warning
	Too hot		PWM input undervoltage		
	Construction of		PANA input purchased		

*Figure 28* Configure Input section of Fault tab

	Status Configure Input Configure Output	
Configure and device	Disable system output for any input fault Yes No	SAVE TAB Vax 47.25V Vour 0
Compare new device	Input voltage	tin 0.38A tour 4
	Change and apply component values on telenetry configure input tab	True 39.5°C Status Summary () View fault status
	Trip point         Comparison           Overvoltage         54.79         0; 320.647	

**Figure 29** Configure Output section of Fault tab



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# **Revision History**

Revision	Date	Description	Page Number(s)
1.0	03/13/20	Initial release	n/a
1.1	10/30/20	Added part number I2C-ADAPTER-A03 Updated figure images Updated automatic updates, added NDA device passkey section	1 all 7
1.2	08/01/24	I2C-ADAPTER-A04 replaces I2C-ADAPTER-A03, I2C-ADAPTER-A03	1

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