
SOFTWARE TOOLS FOR ABB DRIVES

Offline/Virtual drives

Quick installation and start-up guide

Offline/Virtual drives

Quick installation and start-up guide

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Further information



1

Introduction

Contents of this chapter

This chapter contains information on the compatibility, target audience and purpose of this guide. It also refers to a list of related documents for more information.

Compatibility

This manual applies to Virtual drive version 1.5 or later. The virtual drive feature is compatible with ACS380, ACS480 and ACS580 control programs. It also supports the ACS880 drive application programs.

To access the virtual drive feature, you need:

- Drive Composer pro PC tool version 2.9.1 or later. You can download the latest version from the download section of the [ABB Drive Composer](#) home page.

System requirements

■ Hardware requirements

Cable type	For...
USB type A (PC) type mini B (panel) cable Note: ABB recommends to use ferrite core cables.	connecting Drive Composer entry/pro through the USB port of the control panel to a drive (maximum 3 meters)
Ethernet cable RJ45	connecting through Ethernet adapter module or embedded Ethernet

■ Computer hardware requirements

Hardware	Specification
Computer	IBM compatible PC
Processor	Intel i5 level CPU with 2.3 GHz or higher
Memory	8GB
Communication port	One free USB port or Ethernet port

■ Software requirements

Software	Specification
Operating system	Windows 10, Windows 11 or later
Framework	Microsoft .NET Framework 4.8.2 or higher Visual C++ Redistributable Packages for Visual Studio 2015.

Target audience

The reader is expected to be an automation or electrical engineering professional and familiar with drive products and the concepts regarding their commissioning and operation, including the parameter system of ABB drives.

Purpose of the guide

This guide describes how to install the virtual drives application and activate the licenses. It also describes the virtual drive launcher and instructs how to use it in the commissioning and maintenance of ABB drives.

Related documents

Manual	Code
Drive firmware manuals and guides	
ACS380 machinery control program firmware manual	3AXD50000029275
ACS480 standard control program firmware manual	3AXD50000047399
ACS580 standard control program firmware manual	3AXD5000001609
ACS880 primary control program firmware manual	3AUA0000085967
Tools manuals	
Drive Composer Start-up and maintenance PC tool User's manual	3AUA0000094606
Virtual drives quick installation and start-up guide	3AXD50000422128
Option manuals and guides	
FENA-01/-11/-21 Ethernet adapter module user's manual	3AUA0000093568
FPBA-01 PROFIBUS DP adapter module user's manual	3AFE68573271
FMBT-21 Modbus/TCP adapter module user's manual	3AXD50000158607
FEIP-21 EtherNet/IP fieldbus adapter module user's manual	3AXD50000158621
FPNO-21 PROFINET fieldbus adapter module user's manual	3AXD50000158614

Terms and abbreviations

Term	Description
BCU	Type of control unit
CIAM	Customer Identity and Access Management
DI	Digital input
Drive	Frequency converter for controlling AC motors
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
FEN-01	Optional TTL incremental encoder interface module
FEN-11	Optional absolute encoder interface module
FEN-21	Optional resolver interface module
FEN-31	Optional HTL incremental encoder interface module
FENA	Optional Ethernet adapter module
FENA-01	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP and PROFINET IO protocols
FENA-11	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP® and PROFINET IO® protocols
FENA-21	Optional Ethernet adapter module for EtherNet/IP™, Modbus TCP and PROFINET IO protocols, 2-port
FIO-11	Optional analog I/O extension module
FMI	Functional mock-up interface. An open standard that defines a container and an interface for exchanging dynamic models using a combination of XML files, binaries, and C-code zipped into a single file.
FMU	Functional mock-up unit. A file containing simulation model that adheres to FMI standard.
FPTC-01	Optional thermistor protection module
FPTC-02	Optional ATEX-certified thermistor protection module for potentially explosive atmospheres
Frame, frame size	Physical size of the drive or power module
FSO-12, FSO-21	Optional functional safety modules
IGBT	Insulated gate bipolar transistor
Inverter unit	Inverter module(s) under control of one control unit, and related components. One inverter unit typically controls one motor.
Power module	Common term for drive module, inverter module, supply module, brake chopper module etc.
RFI	Radio-frequency interference
STO	Safe torque off (IEC/EN 61800-5-2)
Supply unit	Supply module(s) under control of one control unit, and related components.

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.



Installing Virtual Drives

Contents of this chapter

This chapter describe how to install the ABB Virtual Drives application.

Downloading offline/virtual drives installer

The latest version of the Virtual Drives package can be downloaded from the How to Get Started section on the [ABB Ability™ Virtual Commissioning for drives](#) homepage.

To download the Virtual Drives installer, do the below steps:

1. Install the latest version of Drive Composer pro.
2. Get a free promotional license for ABB Ability™ Virtual Commissioning for Drives. For support, contact your local ABB representative.
3. Download and install Offline or Virtual Drives packages, see section [Offline/Virtual drive package loader \(page 43\)](#).

You can also download the latest installation files from ABB library - [ABB virtual drive installer](#), or contact your local ABB representative.

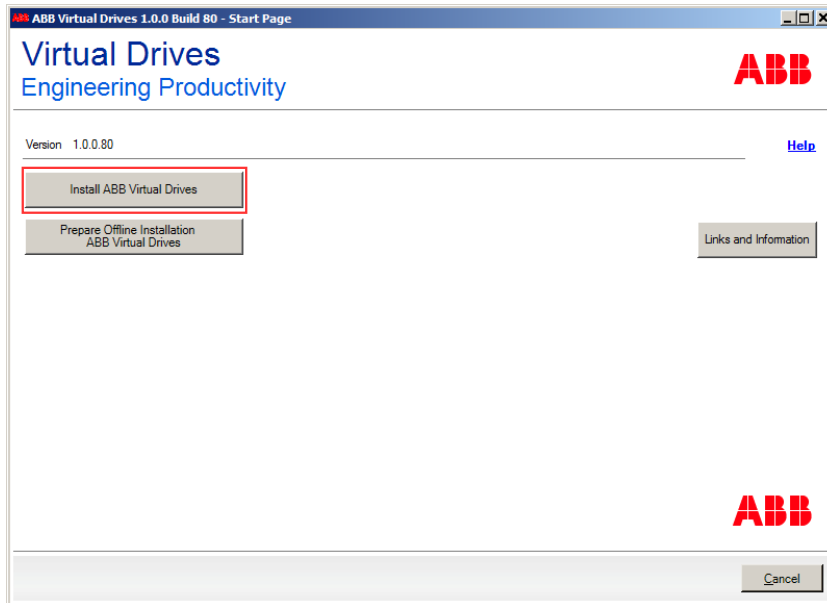
Installation procedure

Launch the virtual drive installation executable file. The Installation manager wizard appears. Follow the instructions in the wizard to complete the installation.

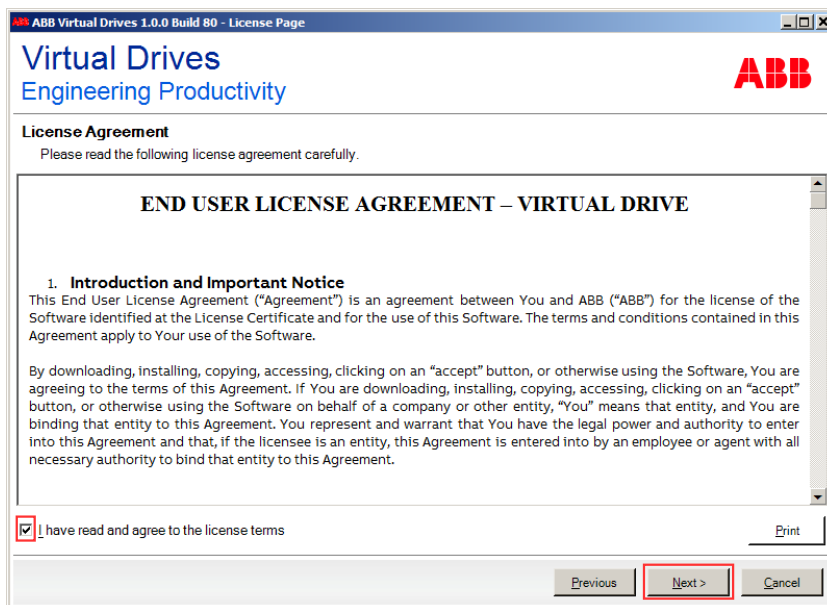
■ Online installation

Online installation of ABB Virtual Drives requires internet access as installation data is downloaded during setup.

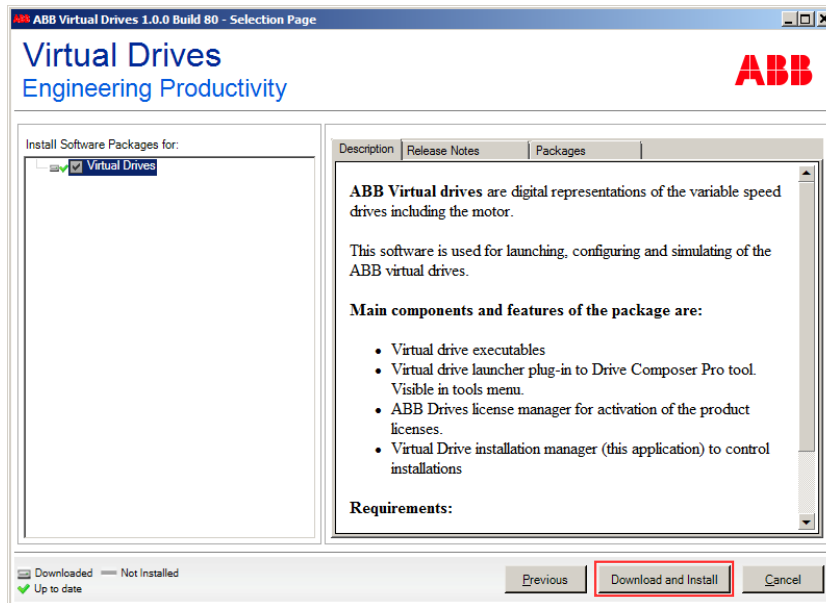
1. In the Virtual Drives start page, click **Install ABB Virtual Drives**.



2. In the License page, read and agree the license agreement. Click **Next**.

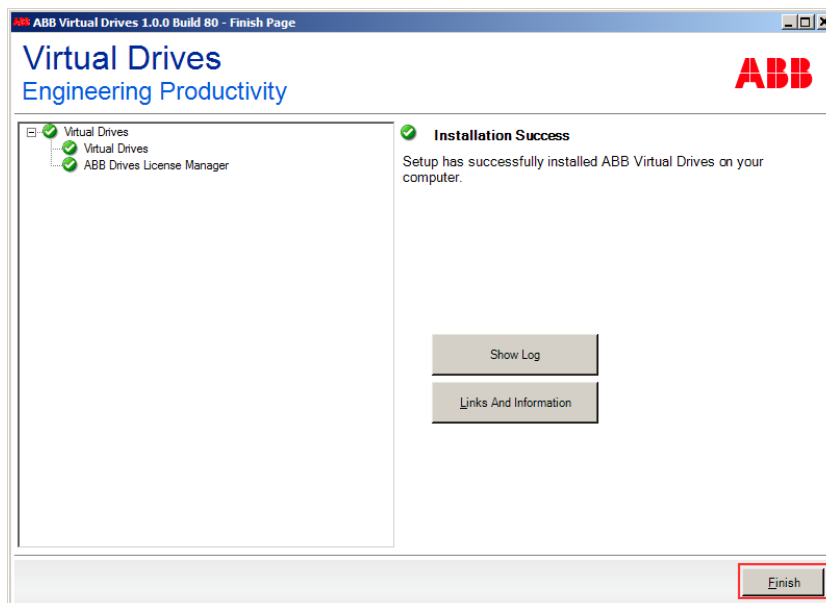


3. In the Selection page, select Virtual Drives and click **Download and Install**.



Data download and installation starts.

4. In the Finish page, click **Finish** to close the installation manager wizard.



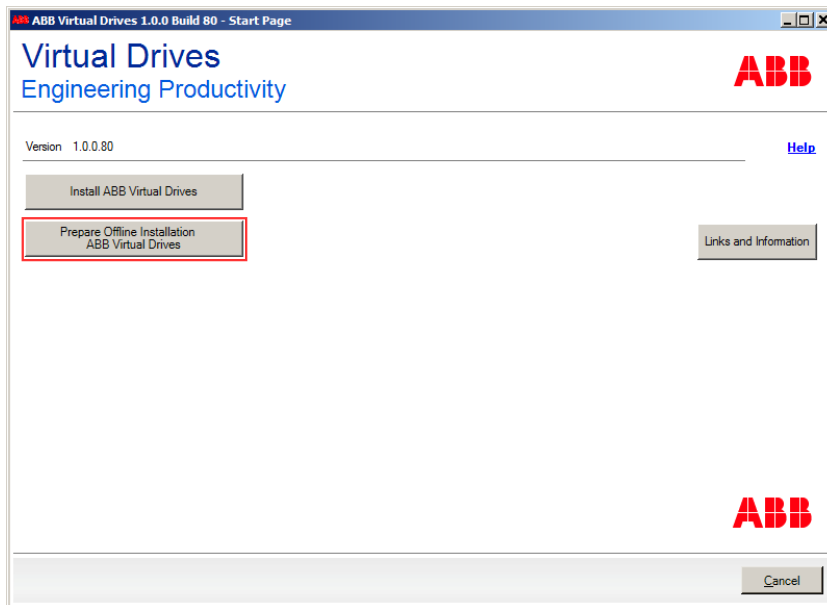
After successful installation, get the license with ABB Drives License Manager. See chapter [Activating virtual drive license \(page 15\)](#). After activating the license, start Drive Composer pro and navigate to Tools menu to start the Virtual drive launcher. See chapter [Offline/Virtual Drive Launcher in Drive Composer pro \(page 23\)](#).

■ Offline installation

An offline installation of ABB Virtual Drives is necessary if you want to install the virtual drive on a remote computer without internet access. Offline installation allows to download installation data with a computer that provides internet access (e.g. to a shared folder, USB stick etc.). Later, this data can be used for installing virtual drives on the desired system.

To install ABB virtual drives offline, do the below steps:

1. In the start page, click **Prepare Offline Installation ABB Virtual Drives**.



2. Click **Download**. Data download starts.
3. Wait until download is completed, then specify a directory to download the data (e.g. shared folder or USB stick).
Data is downloaded to the specified folder.
4. Click **Finish** to close the installation manager wizard.

Execute offline installation

1. On the remote computer, open the previously defined directory and execute *start_menu.exe*.
Installation manager wizard starts and guides you through the installation.
2. Click **Install ABB Virtual Drives Offline**.
3. Click **Install** to start the installation.
4. Click **Finish** to end the wizard.

After successful installation, get the license with ABB Drives License Manager. See chapter [Activating virtual drive license \(page 15\)](#). After activating the license, start Drive Composer pro and navigate to Tools menu to start the Virtual drive launcher. See chapter [Offline/Virtual Drive Launcher in Drive Composer pro \(page 23\)](#).

A large, light gray square with rounded corners, centered on the page. Inside the square is a large, bold, black number '3'.

Activating virtual drive license

Contents of this chapter

This chapter contains information on activating the virtual drive license.

Licensing

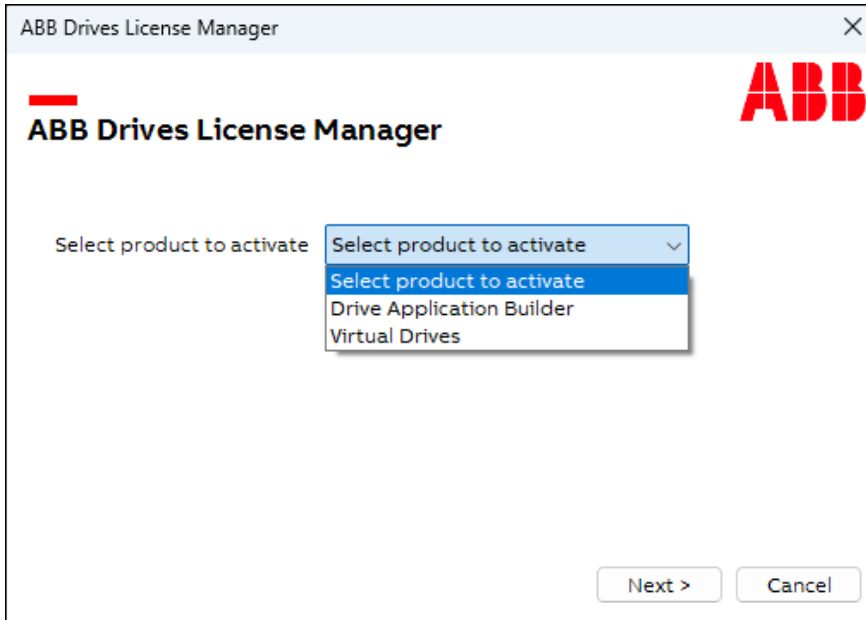
A valid license is required to activate the virtual drive. To activate the license on virtual drive, use **ABB Drives License Manager**. You can activate the license using online and offline modes.

Note: For an active license, contact ABB sales team. If you do not have ABB drives license manager, contact your ABB local representative.

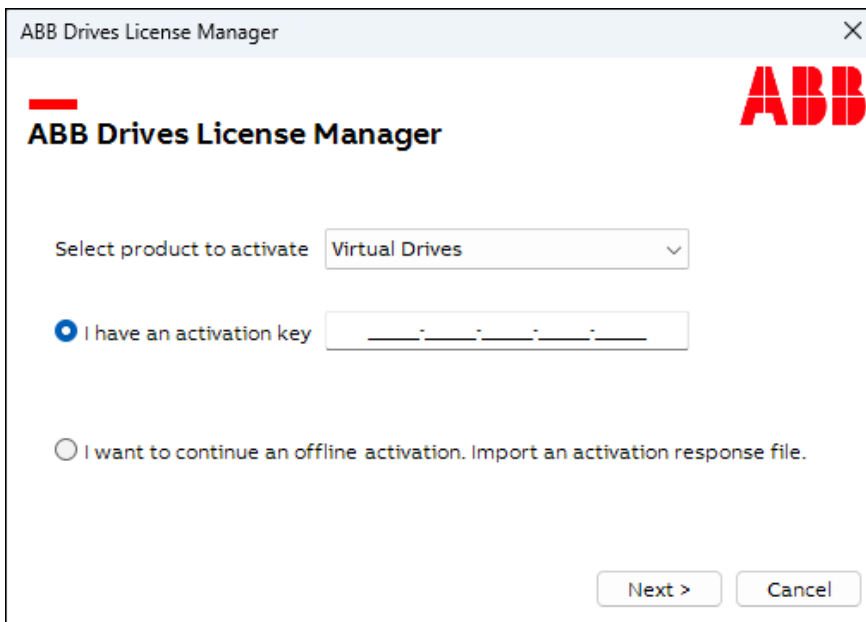
Activating license

To activate license, do the below steps:

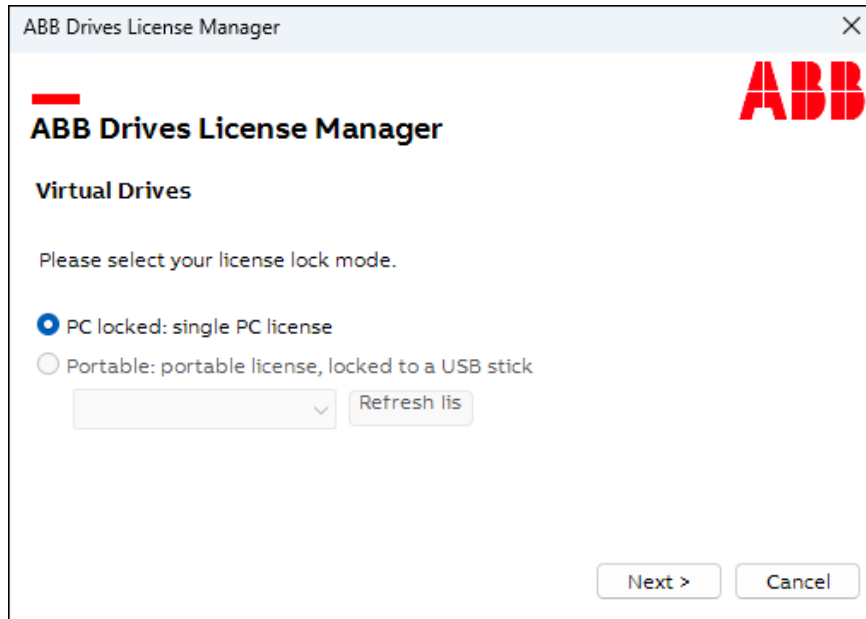
1. Start **ABB Drives License Manager**.
2. Select product to activate (eg. Virtual Drives).



3. Select the option, **I have an activation key**, and enter the key. Click **Next**.

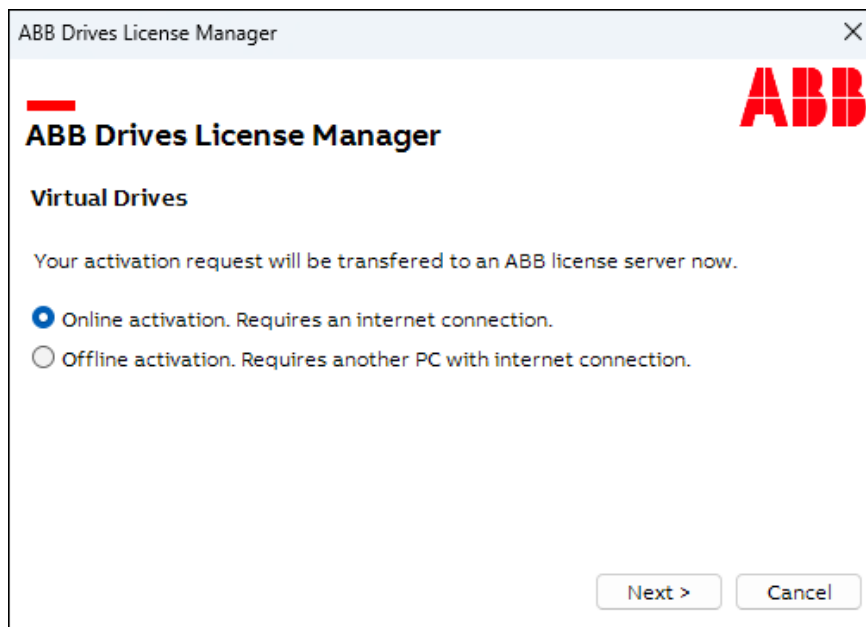


4. Select the option, **PC locked: single PC license** and click **Next**.



5. Choose an activation mode and click **Next**.

- **Online activation:** Select this option if the PC is connected to the Internet, and the same PC is used to activate the license.
- **Offline activation:** Select this if you want to activate the license in a different PC and the PC is not connected to Internet., and the PC cannot be connected to Internet. With this selection, you can download an activation response file for an offline PC.



For information on online activation, see section [Online activation \(page 18\)](#).

For information on offline activation, see section [Offline activation \(page 19\)](#).

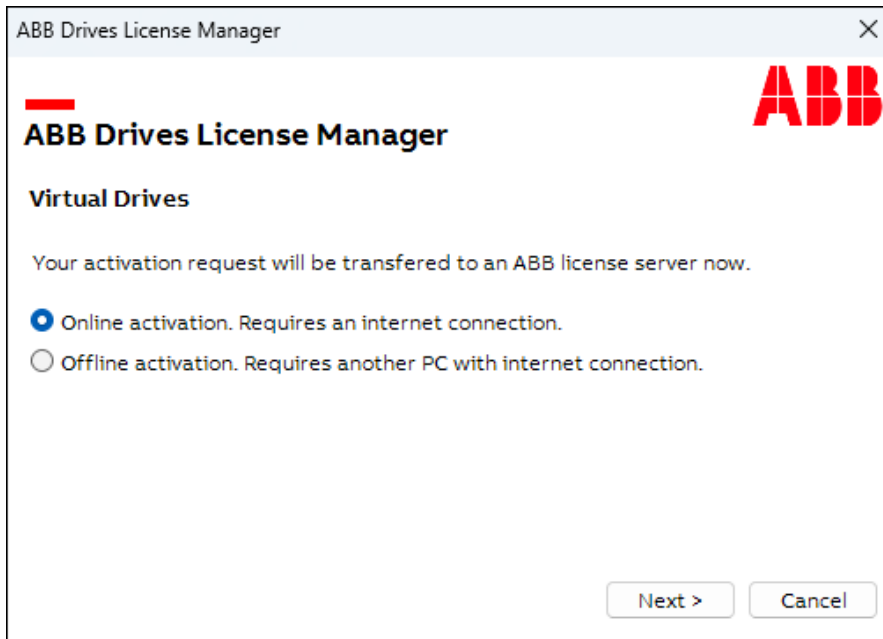
Note: If license activation fails, check the Internet connection (firewall or proxy) is not blocking *ABB Drives Licenses manager.exe* or *Codemeter.exe* to get access to ABB external license server. You can use public Internet connection (mobile phone hotspot) to access license server.

Online activation

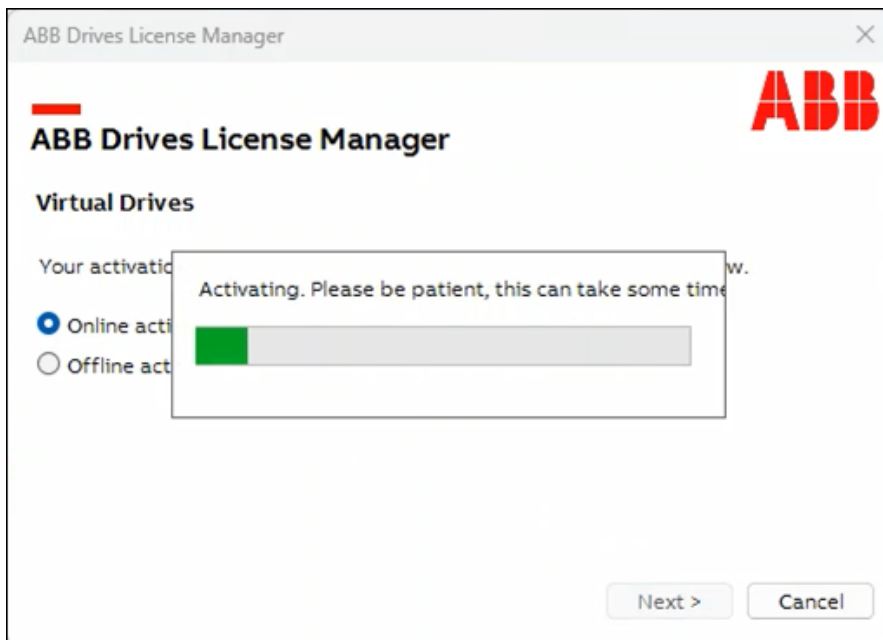
The activation data can be sent to ABB License server if the PC is connected to the Internet.

For online activation, do the below steps:

1. Enable Online activation and click **Next**.



Activation procedure starts.



The activation is successful message appears.

2. Click **Ok** to end the wizard.
The product license is activated.

Offline activation

The activation data cannot be sent to the licensing server if the PC does not have Internet access. In this case, the offline activation file is created. This file can be used to transfer activation data to the licensing server from another PC with Internet access.

Pre-requisite: Get the product activation key from the ABB sales team.

1. From your browser of the PC that has an Internet connection, navigate to [Drive Tools - Offline Activation](#).
 - a. In the Upload activation request window, select the activation file from your computer and click **Upload request and continue**.

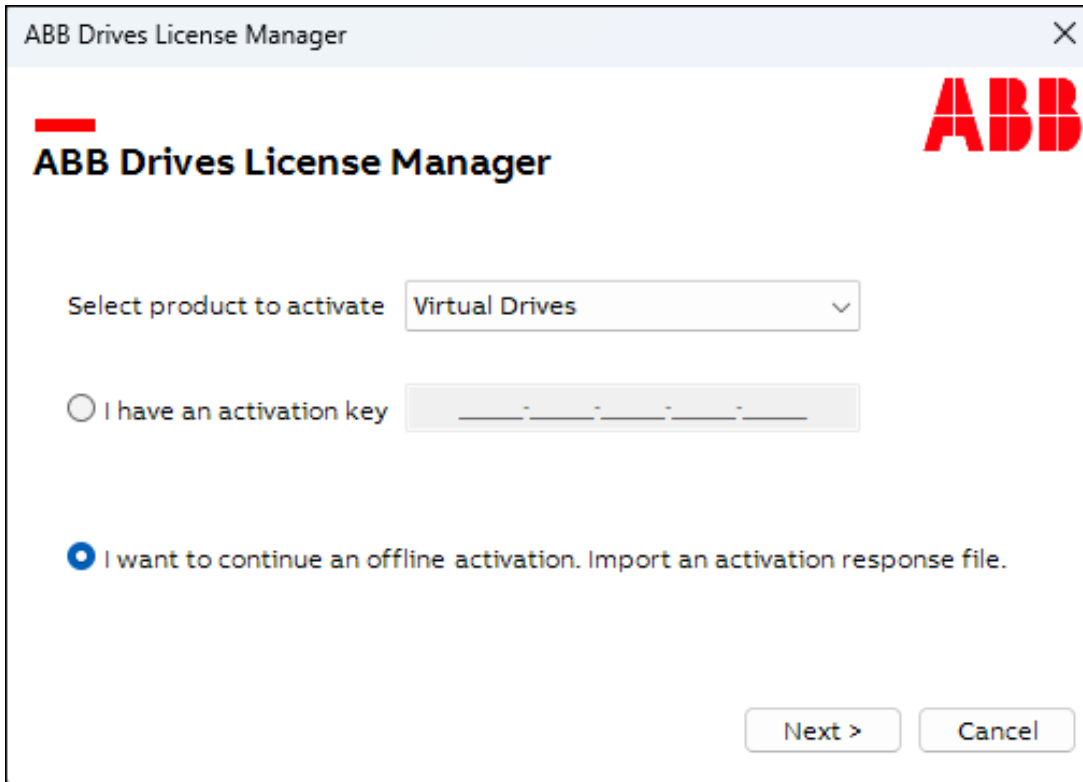
The screenshot shows the 'Drive Tools - Offline Activation' web page. At the top, there is a navigation bar with 'HOME', 'English', and the ABB logo. Below the navigation bar, the page title is 'Drive Tools - Offline Activation'. A progress bar shows three steps: 'Upload activation request' (active), 'Download activation response', and 'Upload activation receipt'. The main content area is titled 'Activating your licenses offline - First step "Upload activation request":' and contains three numbered instructions: 1. Create an activation request file with the Drive Tools Activation Wizard. 2. Pick the created activation request file. 3. Click "Upload request and continue". Below the instructions, there is a file selection area with the text 'Pick activation request file (*.xml)' and a 'Browse...' button. At the bottom, there is a red-bordered button labeled 'Upload request and continue'.

- b. In the Download activation request window, click **Download activation response** to download the response file.

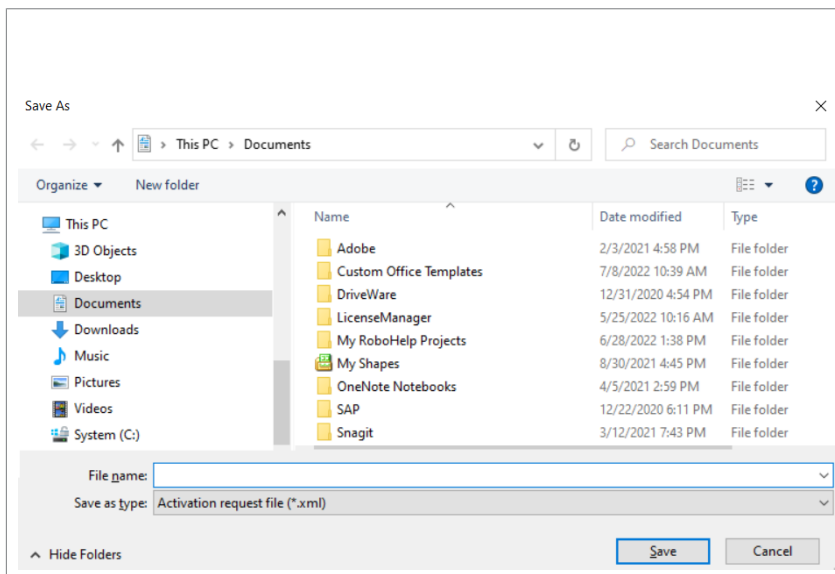
The screenshot shows the 'Drive Tools - Offline Activation' web page at the second step. The navigation bar is the same. The page title is 'Download activation response'. The progress bar shows 'Upload activation request' (disabled), 'Download activation response' (active), and 'Upload activation receipt' (disabled). The main content area is titled 'Activating your licenses offline - Second step "Download activation response":' and contains three numbered instructions: 1. Click "Download activation response" and save the file. 2. Import this activation response file using the Drive Tools Activation Wizard. 3. Please confirm the successful activation by uploading the activation receipt file generated by the Drive Tools Activation Wizard afterwards (only supported for Drive Tools 1.1.1 and later). At the bottom, there is a red-bordered button labeled 'Download activation response' and a 'Next' button.

- c. Store the file to a shareable location. For example, a USB drive or a shared folder.
2. Run ABB Drives License Manager from the start menu.
3. Enable **Offline activation** and click **Next**.

20 Activating virtual drive license



4. Enter the license request file name, click **Save** and save it in the file system that is accessible from the PC that has an Internet connection.



5. Return to the offline PC and start ABB Drives License Manager.
6. Click **Browse** and select the activation response file from the shared location and click **Next**.

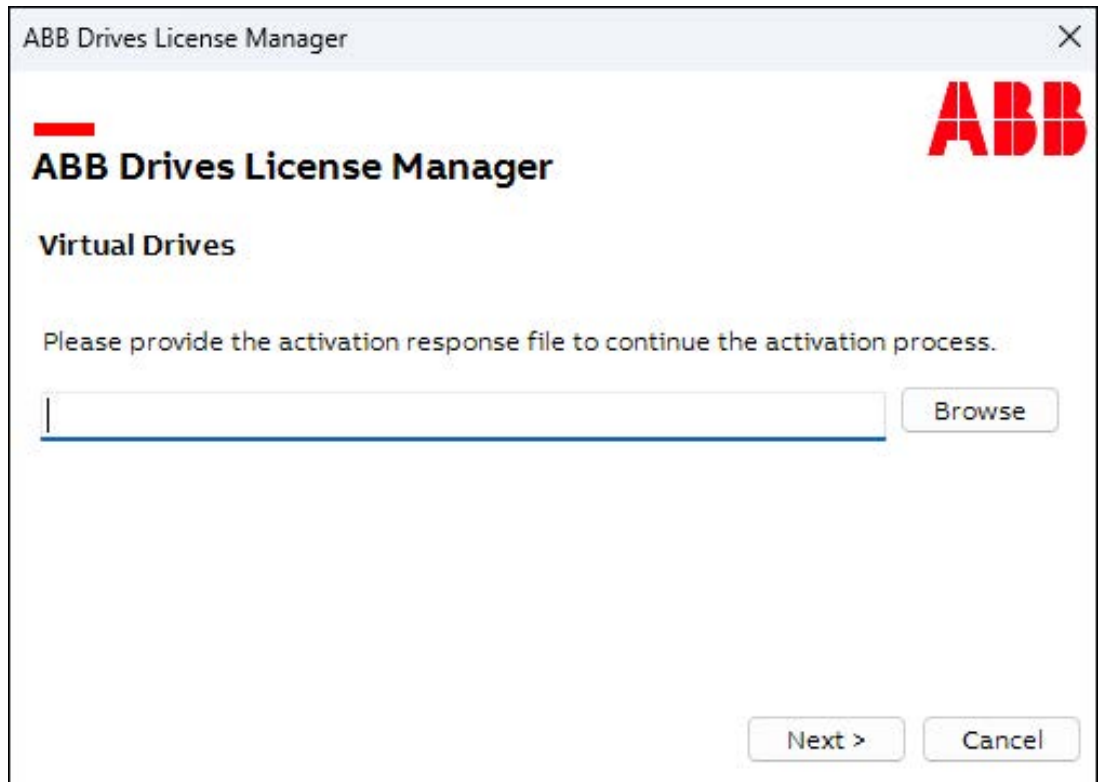


ABB Drives License Manager is activated successfully.

7. Click **Finish** to get the activation response receipt file.
8. Enter a file name and store the activation receipt file to a shareable location.
9. In the PC with Internet availability, navigate to [Drive Tools - Offline Activation](#) and upload the activation receipt file from the shareable location.
Offline license activation is successfully completed.



4

Offline/Virtual Drive Launcher in Drive Composer pro

Contents of this chapter

This chapter describes the main features of Offline/Virtual Drive Launcher in Drive Composer pro.

Overview

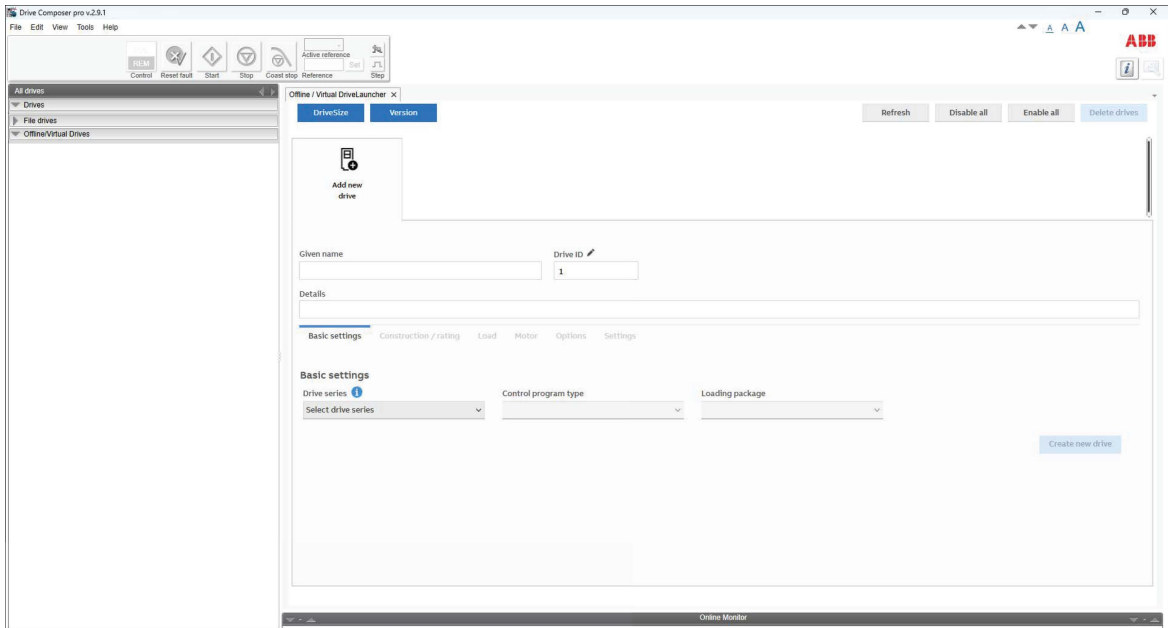
ABB Virtual Drives are digital representations of the variable speed drives including the motor. This software is used for configuring, validating and simulating the ABB virtual drives. Offline drives are the digital representation of variable speed drives and do not require a motor model. They are used for configuring, validating, and backing up/restoring parameters.

ABB offers Offline/Virtual drive launcher as a plugin for Drive Composer pro, a start-up and maintenance tool for ABB drives. The tool enables the user to set up, start, and connect to Offline/Virtual drives, set parameters, input signals and check if the expected response is available to run initial tests.

You can start Offline/Virtual drive launcher by navigating to **Tools** → **Virtual drive launcher**. The figure below shows the main user interface of virtual drive launcher.



The below figure shows the main user interface for launching and configuring virtual or offline drives.



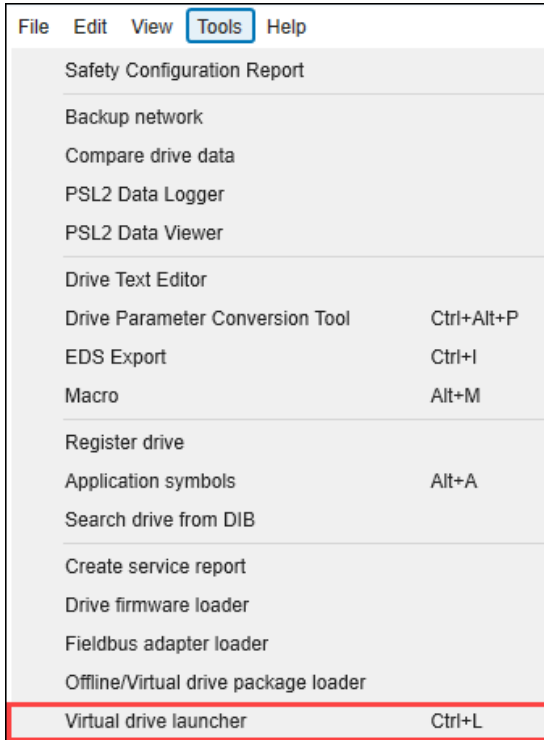
The working area can be used either with a tab or a floating window. You can select **View → Tabs** to use the tabs in the working area or **View → Floating windows** to use a floating window in the working area.

- **Drive size** - Displays Drive size online version for selecting an optimal motor and drive.
- **Version** - Displays virtual drives version and available targets.
- **Refresh** - Rescans all connected Offline/Virtual drives and real drives (All drives menu pane in the Drive Composer (pro). You can also refresh using the main menu **View → Refresh (Ctrl+R)**).
- **Disable all** - Disables all the virtual drives.
- **Enable all** - Enables all the virtual drives.
- **Delete drives** - Provides option to select which drives to be deleted and then by clicking **Confirm** button deletes the drives.
- **Add new Virtual drive** - Enables to add new Offline/Virtual drive.

Adding new Offline/Virtual drive

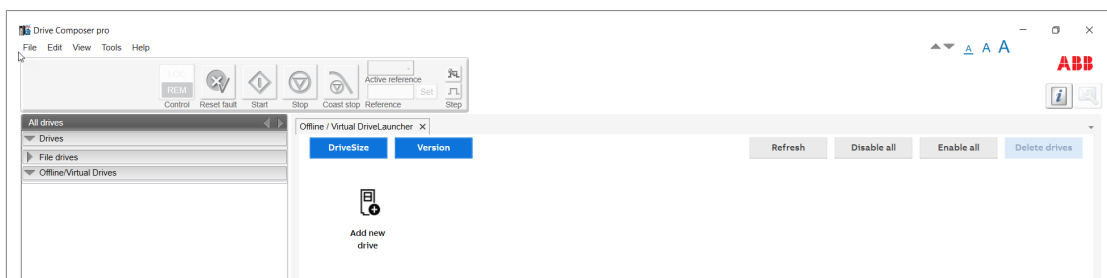
To add a new Offline/Virtual drive, do the below steps:

1. Go to **Tools** → **Virtual drive launcher** or press **Ctrl +L**.



The Offline/Virtual Drive Launcher window opens.

2. Click **Add new drive**.
3. Enter the desired drive name in the Given name field.
4. Enter virtual drive ID, otherwise it is generated automatically. For example, ID #1, ID #2 etc.
5. Configure virtual drives using the tabs. For further information on tabs, see [Drive configuration](#).
6. Click **Create new drive**.



The new offline or virtual drive is created.

Similarly, you can create multiple virtual drives as needed by repeating steps 1 to 6.

Drive configuration

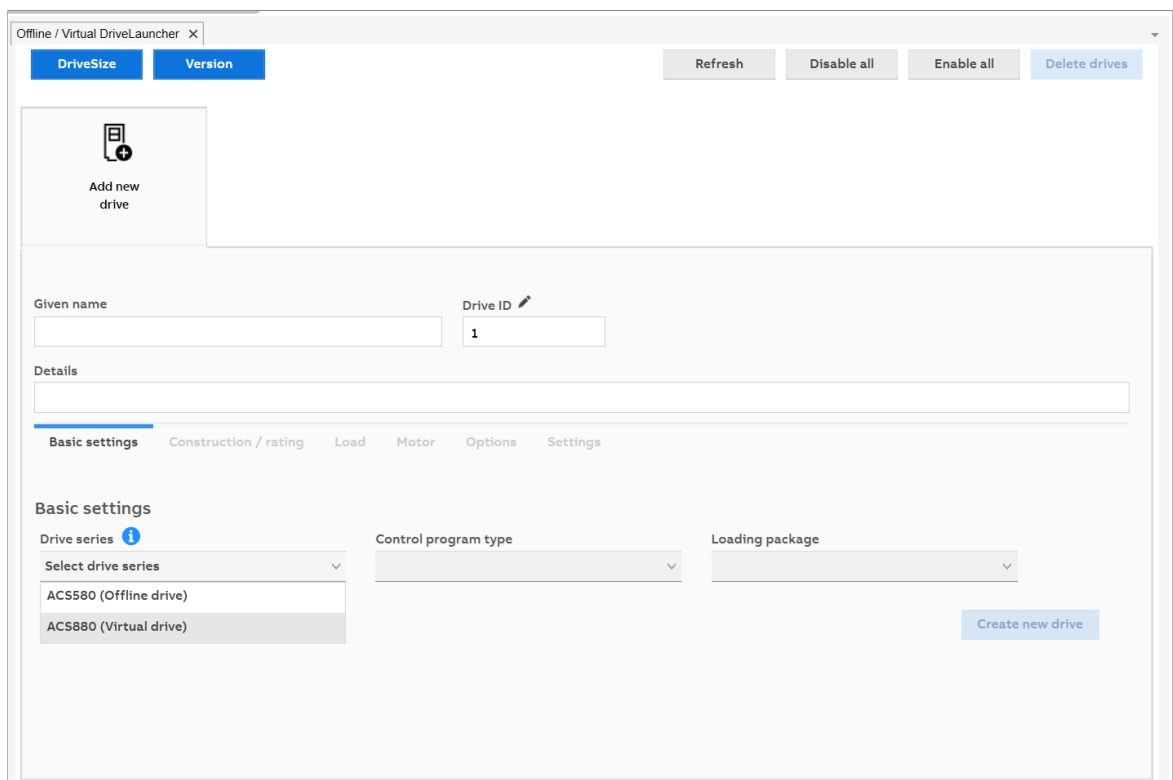
Drive configuration functionality depends on the drive family and firmware selected.

■ Basic settings

In the Offline/Virtual Drive Launcher window, from the Basic settings tab, you can create a new offline/virtual drive. You can select the required Drive series, Control program type and Loading package versions from the available list.

All selections are mandatory.

1. Drive series: Shows the list of available drive series.
2. Control program type: Shows the list of control program types available for the selected drive series.
3. Loading package version: Shows the list of firmware or loading package versions available for the selected drive series and control program type.



■ Construction & rating

The Construction & rating tab consists of Drive type, Construction, Voltage and Size (in amperes) selections. You can select the desired selection from the drop-down list to create a new virtual drive. All the selections are mandatory.

1. Drive type: Shows the list of available drive types.
2. Construction: Shows the list of drive construction options applicable for the selected drive type.
3. Voltage/IP Class: Shows the list of available supply voltage range/IP class.
4. Size (in amperes): Shows the list of drive sizes (in amperes).
5. Ratings: shows the filtered ratings of a voltage sub class of different drive sizes.

28 Offline/Virtual Drive Launcher in Drive Composer pro

Construction/rating: offline drive

Offline / Virtual DriveLauncher X

DriveSize Version Refresh Disable all Enable all Delete drives

Add new drive

Given name ACS580-01-017A-2 Drive ID 1

Details
Drive series: ACS580 (Offline drive) | Control program type: Standard control | Loading package: ASCDX v2.18.1.6 | Construction / rating: ACS580-01-018A-2

Basic settings Construction / rating Load Motor Options Settings

Construction / rating

Drive Type ACS580 Voltage/IP Class Un = 208-240 (2) Ratings ACS580-01-018A-2

Create new drive

Construction rating: virtual drive

Offline / Virtual DriveLauncher X

DriveSize Version Refresh Disable all Enable all Delete drives

Add new drive

Given name ACS580-01-017A-2 Drive ID 1

Details
Drive series: ACS880 (Virtual drive) | Control program type: Primary Control | Firmware version: AIN VX v3.46.0.0 | Construction / rating: ACS880-01-06A6-2 (931)

Basic settings Construction / rating Load Motor Options Settings

Construction / rating

Drive Type ACS880 Construction 01 Wall mounted Voltage/IP Class Un=208-240 V (2)

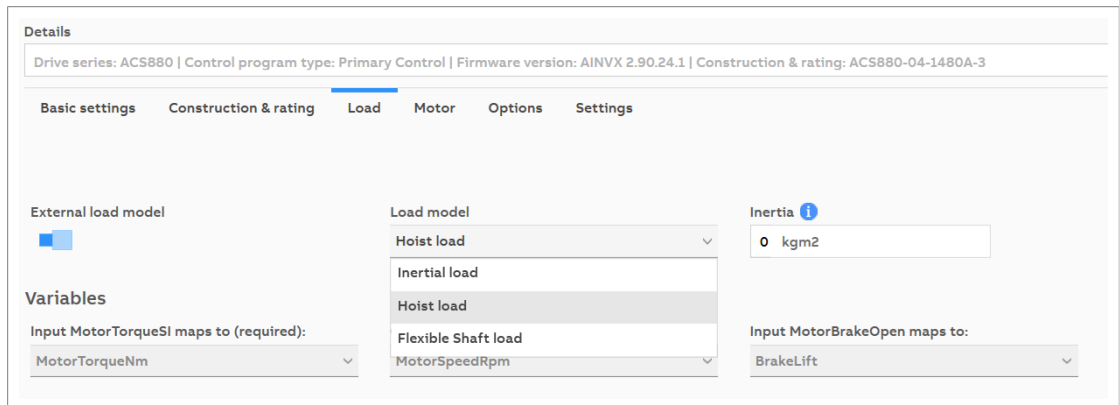
Size (in amperes) 06A6

Create new drive

■ Load

The Load tab consists of Load model, Inertia and External load model options. The data is used to configure parameters of simulated load for virtual drive. All the selections are optional.

- Load model: Selects the load models, such as Inertial load, Hoist load, and Flexible shaft load. For more information, see section [Functional mock-up units \(FMU models\)](#) (page 31).



- Inertia: Enter the load inertia in kgm^2 . If there is a gear between the load and the motor, then the load inertia must be reduced on the motor side.

Note:

The value is applicable only for Inertia load model.

- External load model: Enables/disables external load model. The External load model is used to estimate speed value, using e.g. Robot studio. The estimated value is fed back to the virtual drive. The interface block can be used in Robot studio.

If you select **External load model**, then the application ignores the selected load model and considers only variables provided through external sources.

Load models are currently applicable to ACS880 virtual drives , (add the load section text from offline drive that load models are not applicable to offline drives)

Note: The load tab is not applicable for offline drives.

■ Motor

The Motor tab consists of Motor electrical data and Motor mechanical data. The data is used to configure parameters for virtual drive.

- Motor electrical data: Input the Nominal torque, Maximum to nominal torque ratio, Nominal cosphii and Efficiency.
- Motor mechanical data: Input the Inertia, Mechanical friction and Windage.

The screenshot shows the 'Motor' tab in the Drive Composer pro software. At the top, there are fields for 'Given name' (AC5880-01-017A-2) and 'Drive ID' (1). Below this is a 'Details' section with a text box containing: 'Drive series: ACS880 (Virtual drive) | Control program type: Primary Control | Firmware version: AIN VX v3.46.0.0 | Construction / rating: ACS880-01-145A-2 (942)'. A navigation bar below the details includes tabs for 'Basic settings', 'Construction / rating', 'Load', 'Motor' (which is selected), 'Options', and 'Settings'. The main area is divided into two columns: 'Motor electrical data' and 'Motor mechanical data'. Under 'Motor electrical data', there are input fields for 'Nominal torque' (0 Nm), 'Maximum to nominal torque ratio' (3), 'Nominal Cosphii' (0.8), and 'Efficiency' (92 %). Under 'Motor mechanical data', there are input fields for 'Inertia' (0 kgm2), 'Mechanical friction' (2 %), and 'Windage' (0 P.U.). A 'Create new drive' button is located in the bottom right corner.

Note: Motor tab is not applicable to offline drives.

■ Functional mock-up units (FMU models)

The load models available in the **Load model** drop-down are Functional Mock-up Units (FMU models). As per the Functional Mock-up Interface (FMI) standards, three variable types are available in FMU models. The three variable types are Input, Output and Parameter variables.

For example, the Inertial load FMU model consists of following variables:

- two input variables: MotorTorqueSI and AdditionalLoad
- one output variable: MotorSpeedSI, and
- zero parameters

In a FMU load model, the motor torque (input) and motor speed (output) variables are mandatory and other extra inputs and output variables are optional.

Note: By default, virtual drive consists of three pre-packaged FMU models with correct FMU variables mapped to the matching virtual drive variables.

For example,

- In Inertial load model, the virtual drive variable MotorTorqueSI is mapped to the FMU model variable MotorTorqueSI. The name is kept same for Inertial load to ensure backward compatibility with the previous virtual drive versions.
- For Hoist load, the virtual drive variable MotorTorqueSI is mapped to the FMU model variable MotorTorqueNm. Note that the name in FMU model is different than what virtual drive expects. So while mapping, we define virtual drive with the required variable (MotorTorqueNm).

Note: In the pre-packaged model all mappings are configured and cannot be edited. If necessary, you can create custom models and configure the variables. For more information, see section [Custom load model \(page 34\)](#).

Inertial load

This is the default load model. The required variables are pre-defined and cannot be edited.

Details

Drive series: ACS880 | Control program type: Primary Control | Firmware version: AIN VX 2.90.24.1 | Construction & rating: ACS880-04-1480A-3

Basic settings Construction & rating **Load** Motor Options Settings

External load model

Load model: Inertial load ▼

Inertia ⓘ

Variables

Input MotorTorqueSI maps to (required): MotorTorqueSI ▼

Output MotorSpeedSI maps to (required): MotorSpeedSI ▼

Input AdditionalLoad maps to: AdditionalLoad ▼

Apply

Hoist load

The required variables for hoist operation is configured. If required, parameters values can be changed. You need to restart the virtual drive after changing the parameters.

Basic settings Construction & rating **Load** Motor Options Settings

External load model Load model: Hoist load Inertia: 0 kgm2

Variables

Input MotorTorqueSI maps to (required): MotorTorqueNm

Output MotorSpeedSI maps to (required): MotorSpeedRpm

Input MotorBrakeOpen maps to: BrakeLift

Input AdditionalLoad maps to: AdditionalLoadKg

Input MotorInertia maps to: TotalInertiaKgm2

Output Enc1PositionRad maps to: MotorPositionRad

Output Enc2PositionRad maps to: LoadPositionRad

Parameters

GearRatio: 20 LoadWeight_kg: 500 RadiusDrum_m: 0.2 RopeStiffness_N_pro_m: 100000

Apply

Note: You cannot change the parameters of a running virtual drive.

Flexible shaft load

The required variables for flexible shaft machines are defined. If required, parameters values can be changed. You need to restart the virtual drive after changing the parameters.

Basic settings Construction & rating **Load** Motor Options Settings

External load model Load model: Flexible Shaft load Inertia: 0 kgm2

Variables

Input MotorTorqueSI maps to (required): MotorTorqueNm

Output MotorSpeedSI maps to (required): MotorSpeedRpm

Input AdditionalLoad maps to: LoadTorqueNm

Input MotorInertia maps to: TotalInertiaKgm2

Output Enc1PositionRad maps to: MotorPositionRad

Output Enc2PositionRad maps to: LoadPositionRad

Parameters

GearRatio: 2 LoadInertia_kgm2: 1 RelativeDamping_percent: 5 Stiffness_Nm_pro_rad: 1

Apply

Note: You cannot change the parameters of a running virtual drive.

Supported FMI standards

Virtual drive implements the FMI (Functional Mock-Up Interface) 2.0 co-simulation standard. virtual drive only accepts:

- FMU models that are compatible with Windows (.dll), and
- has x86 architecture (must be 32-bit .dll files).

■ **Custom load model**



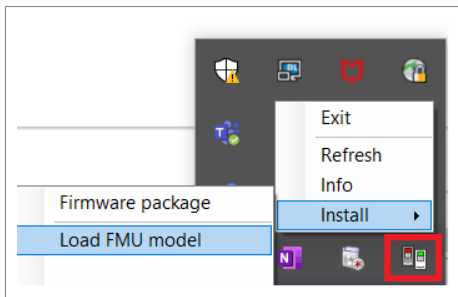
WARNING! Use this feature only if you have knowledge on FMU models and its configuration.

The custom load model allows you to manually configure the FMU variables with the virtual drive variable.

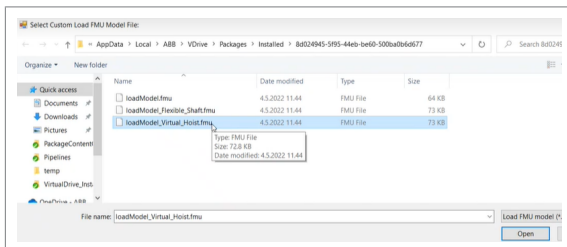
Note: Virtual Drive implements the FMI 2.0 co-simulation standard and accepts FMU models that are compatible with Windows (.dll) and have x86 architecture (must be 32-bit .dll files).

To create a custom FMU model

1. Navigate to the icon tray. Right-click on the virtual drive icon → **Install** and select **Load FMU model**.



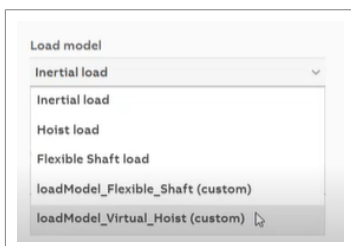
2. Browse the FMU model (.FMU) on your computer and click **Open**. For information on supported models, see section [Supported FMI standards \(page 33\)](#).



If the import is successful, a success message appears. Else, an error message is displayed.

3. Restart Drive Composer pro and Virtual drive manager, or create a new virtual drive.

The new FMU model appears in the **Load model** drop-down.



4. Select the uploaded custom FMU load model from the **Load model** drop-down and in the **Variables** section, map the FMU variables to the virtual drive variables. The available variables are listed in the table below:

Type	Name	Description
Input (double) Note: This variable is mandatory	MotorTorqueSI	Motor torque in Nm.
Output (double) Note: This variable is mandatory	MotorSpeedSI	Motor speed in RPM.
Input (double)	AdditionalLoad	Additional load controlled by the IO Console variable Load torque . The unit depends on the FMU model, as the value of the IO console Load torque is passed directly to the FMU. For hoist load, the unit is kg. For Interrial load and Flexible Shaft load, the unit is Nm.
Input (boolean or double)	MotorBrakeOpen	Boolean or Double (1.0 / 0.0) representing whether the brake is open or not.
Input (double)	MotorInertia	Motor inertia in kgm ² .
Output (double)	Enc1PositionRad	Encoder 1 position.
Output (double)	Enc2PositionRad	Encoder 2 position.

- If required, define the parameters. Parameters are input variables which are set at the beginning of simulation and need not be changed. You can enter any constant value. The values are used by the FMU models when the virtual drive starts.

Parameters

GearRatio <input style="width: 90%;" type="text" value="20"/>	LoadWeight_kg <input style="width: 90%;" type="text" value="500"/>	RadiusDrum_m <input style="width: 90%;" type="text" value="0.2"/>	RopeStiffness_N_pro_m <input style="width: 90%;" type="text" value="100000"/>
--	---	--	--

Note: Virtual drive tool supports up to 100 FMU parameters. The drive can also support up to 150 parameters based on the performance of the computer used. If you use more than 200 parameters, the tool crashes or becomes unresponsive.

■ Deleting custom FMU model

Note: ABB recommends this procedure only for advanced users.

To completely remove the information of a FMU model,

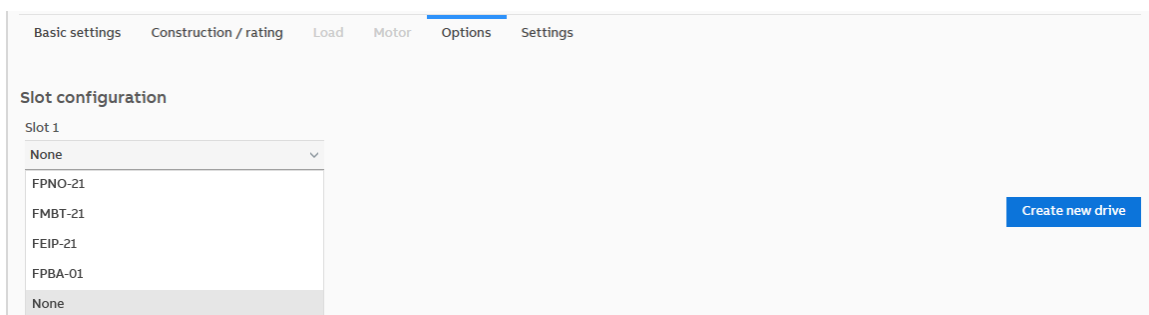
1. Delete the FMU model from the
`%LOCALAPPDATA%\ABB\VDrive\Workspace\CustomLoad` location.
2. Restart VirtualDriveManager and Drive Composer pro.

Note: If the deleted FMU model was used in any virtual drive, then you need to configure the load model again to a valid option to start the instance.

■ Options

The Options tab defines Slot configuration selections on the control board You can select the desired selection from the drop-down list. All the selections are optional.

- Slot configuration: Shows the list of available optional modules. For example, FPNO-21, FMBT-31, FEIP-21, FPBA-01 and None.

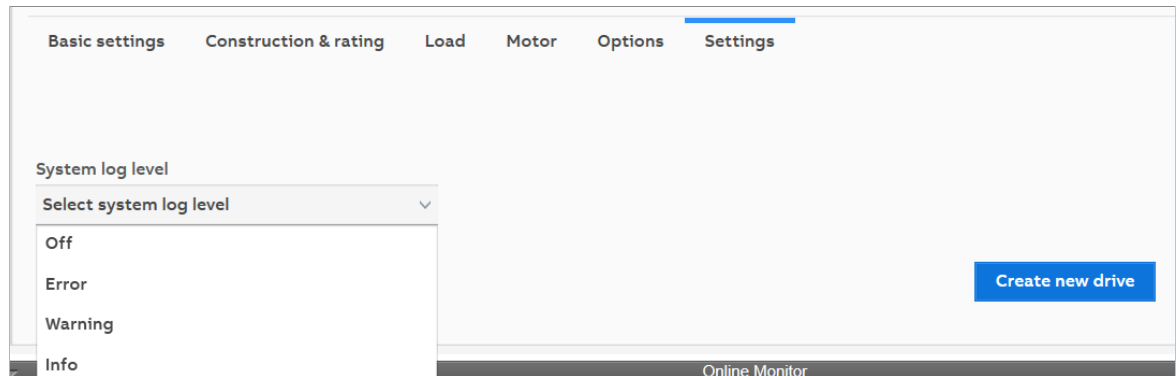


Note: Check the actual placement of the FPNO-21, FMBT-21, FEIP-21, and FPBA-01 option modules corresponding to the real drive and offline or virtual drives. Especially if the parameter backup is made with an offline or virtual drive, it will be restored to the real drive.

■ Settings

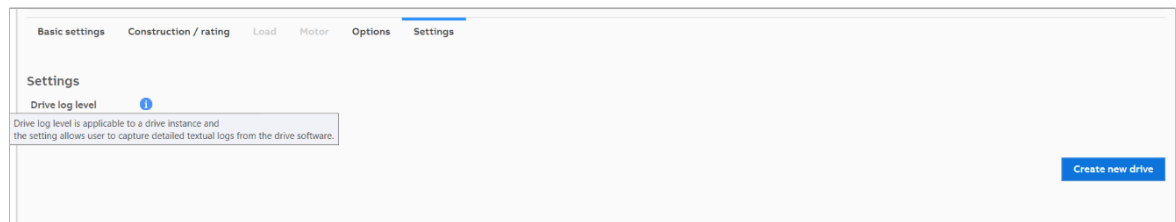
The Settings tab consists of System log level selections.

- System log level: Shows the list of System log level options. For example, Off, Error, Warning or Info.



The Settings tab consists of Offline/Virtual drive log level selections.

- Drive log level: the drive log level is applicable to a drive instance and the setting allows user to capture detailed textual logs of the drive software. For example, Off, Error, Warning or Info.

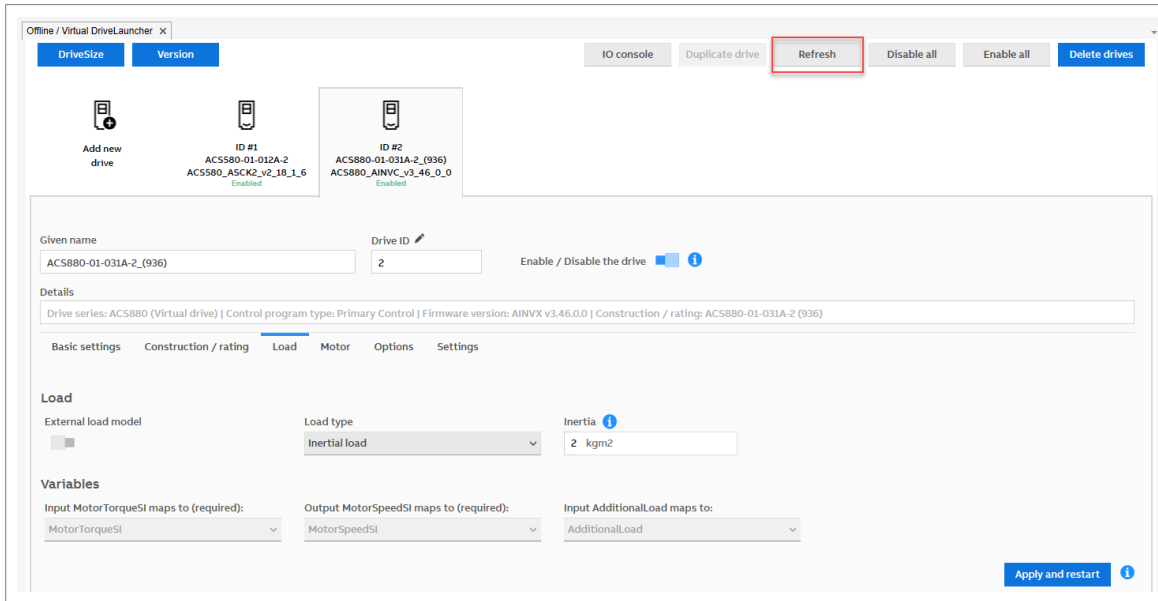


Refresh

The Refresh option initiates the discovery procedure for all the offline or virtual drives and connected real drives. When you create or delete virtual drives, click **Refresh** to refresh the list of all the virtual drives in the drive navigation window.

In addition, if you modify virtual drive configurations (load, motor, options, settings, etc.) of an already connected drive, after pressing **Apply and restart**, you also need to press the **Refresh** button to establish a new connection from Drive Composer pro to your instance.

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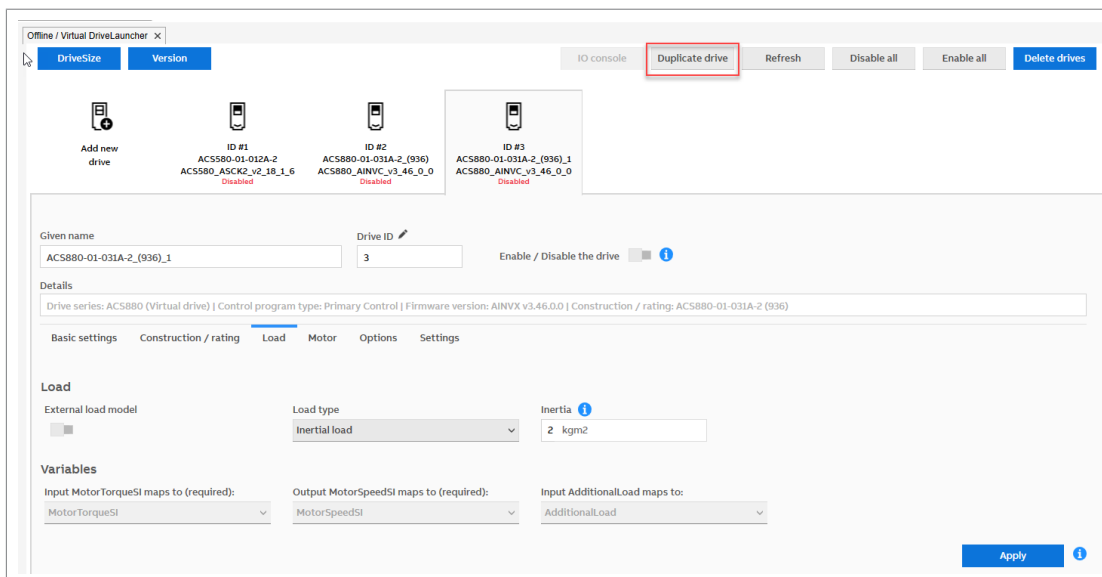


Note: Clicking the refresh button will refresh all drives.

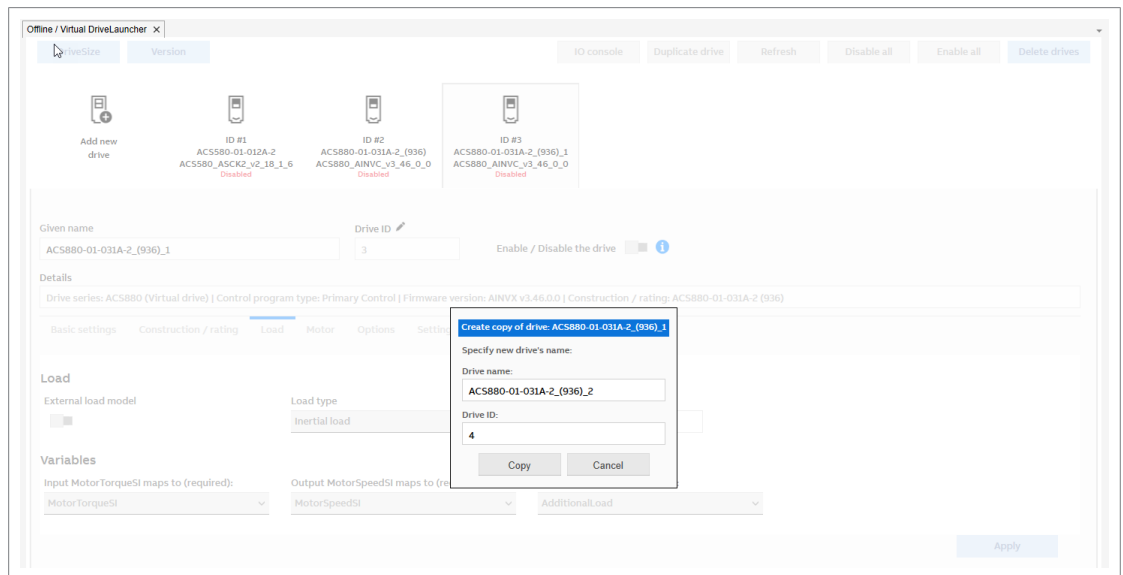
Duplicate drive

Duplicate drive option allows you to create a new virtual drive with similar configuration to an already created instance. To duplicate a drive, make sure the drive is disabled.

1. Select the virtual drive instance to duplicate.
2. Click on **Duplicate drive**.



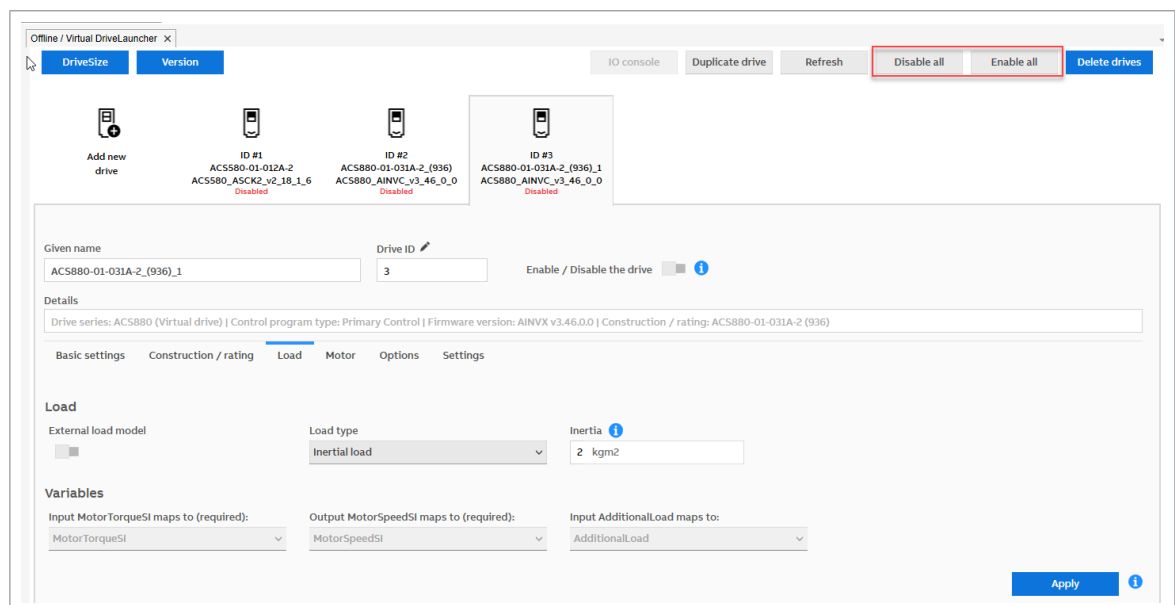
3. Specify Drive name and Drive ID.



4. Click on **Copy**.

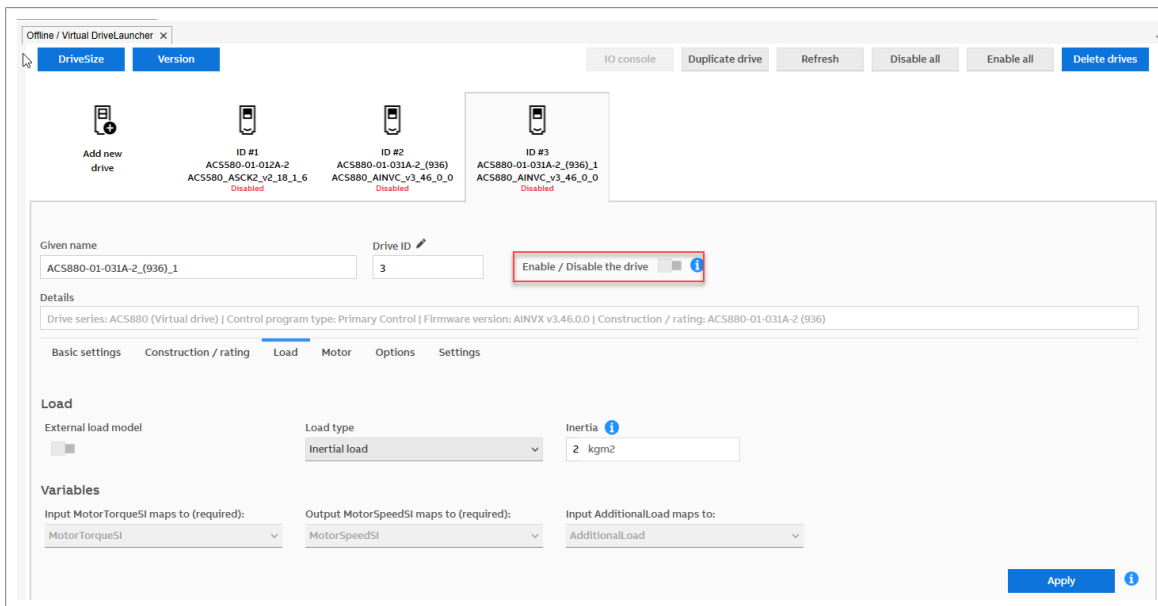
Enabling/disabling Offline/Virtual drives

You can enable or disable all created virtual drives by clicking on **Enable All** or **Disable All** button.



You can also enable or disable virtual drives individually using **Enable / Disable the drive** switch from the configuration area after selecting the drive from virtual drive instance list.

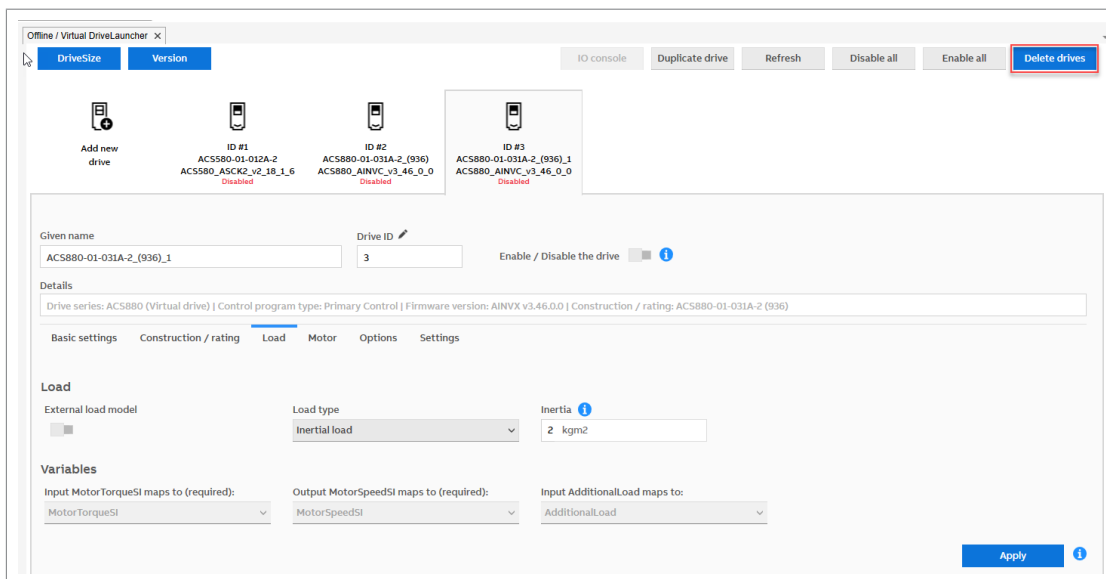
40 Offline/Virtual Drive Launcher in Drive Composer pro



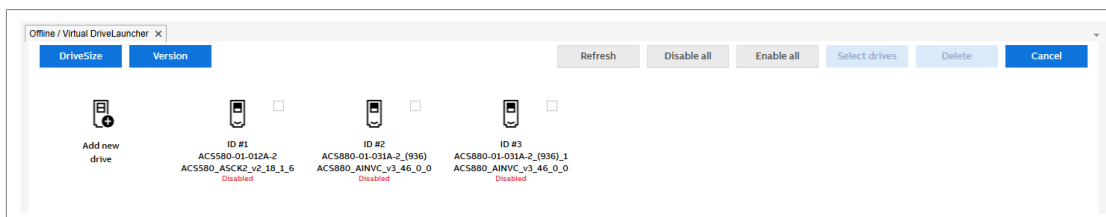
Deleting the Offline/Virtual drives

To delete virtual drives:

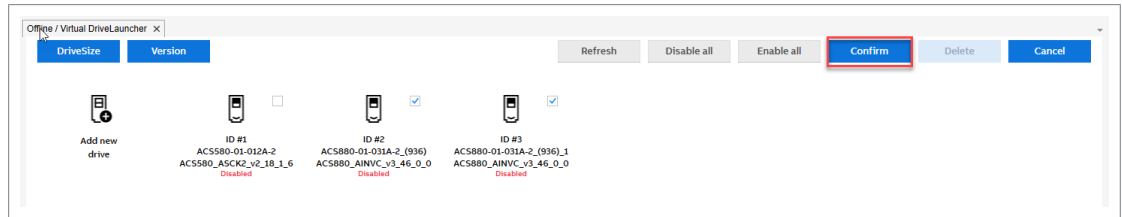
1. Click **Delete drives**.



2. Select the check boxes for all the virtual drives to be deleted.



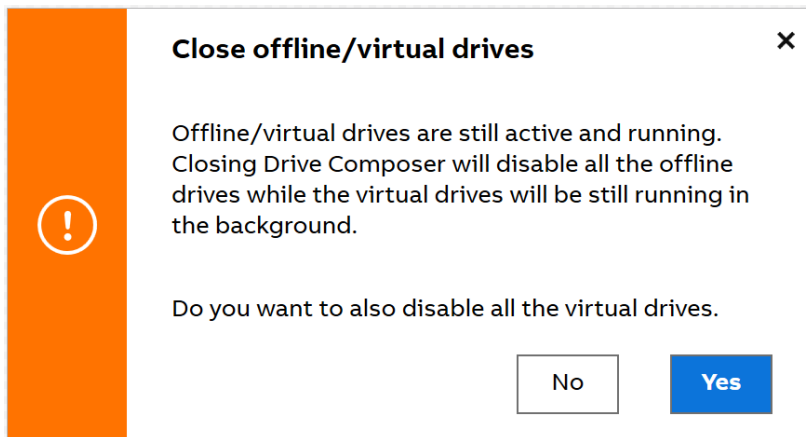
3. Click **Confirm**.



Closing Drive Composer pro

When you try to close Drive Composer pro while offline or virtual drives are enabled, the tool displays a warning message.

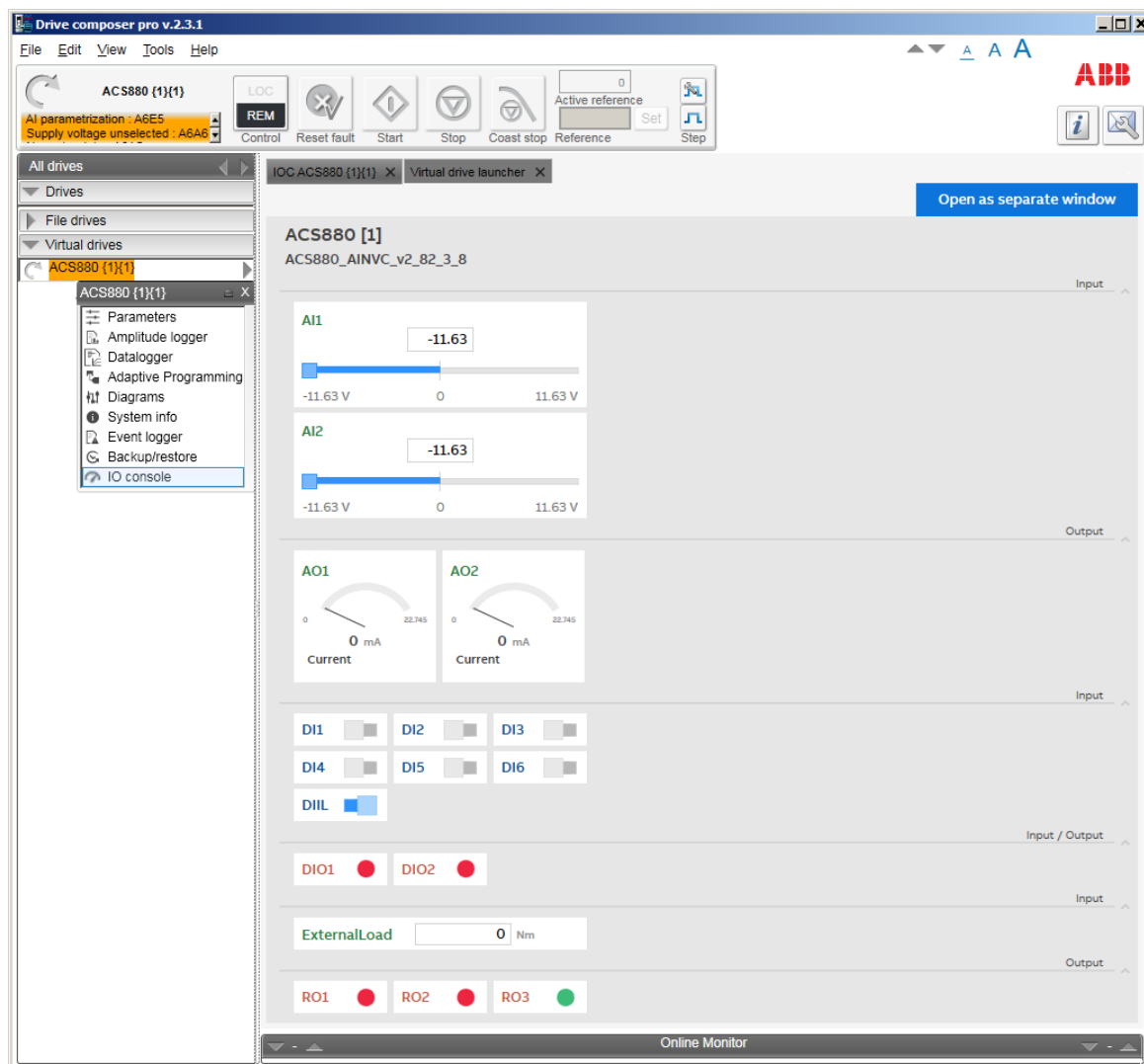
- Click **Yes** to disable virtual drives and close Drive Composer pro.
- Click **No** to close Drive Composer pro and to resume operation of the virtual drives after restarting Drive Composer pro.
- Offline drive disables by default.



IO console

The IO console in virtual drives shows the input and output signal terminals of the drive, representing the state of a simulated control board.

To launch IO console, right-click on virtual drive and select **IO console**. The IO console screen appears.



You can view IO console screen in a separate window by clicking on **Open as separate window**.

Using IO console, you can:

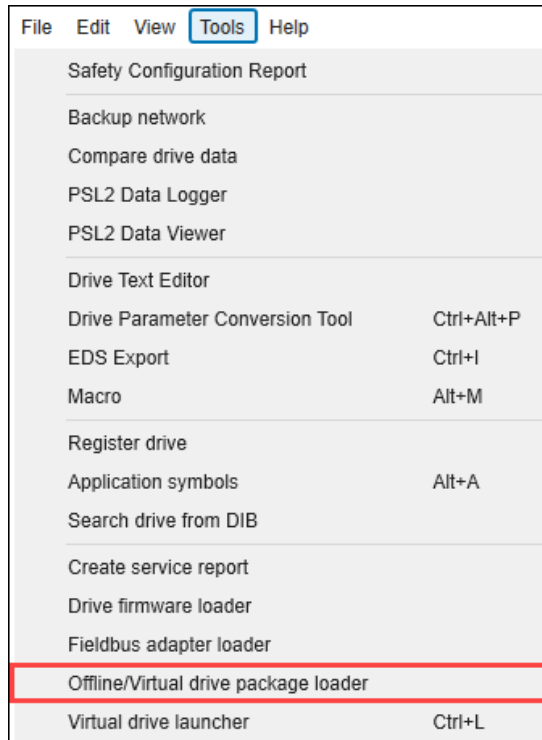
- force analog and digital inputs.
- view the status of relays, digital and analog outputs.
- define the value of actual load torque in Nm.

The IO console is not supported in case of offline drives.

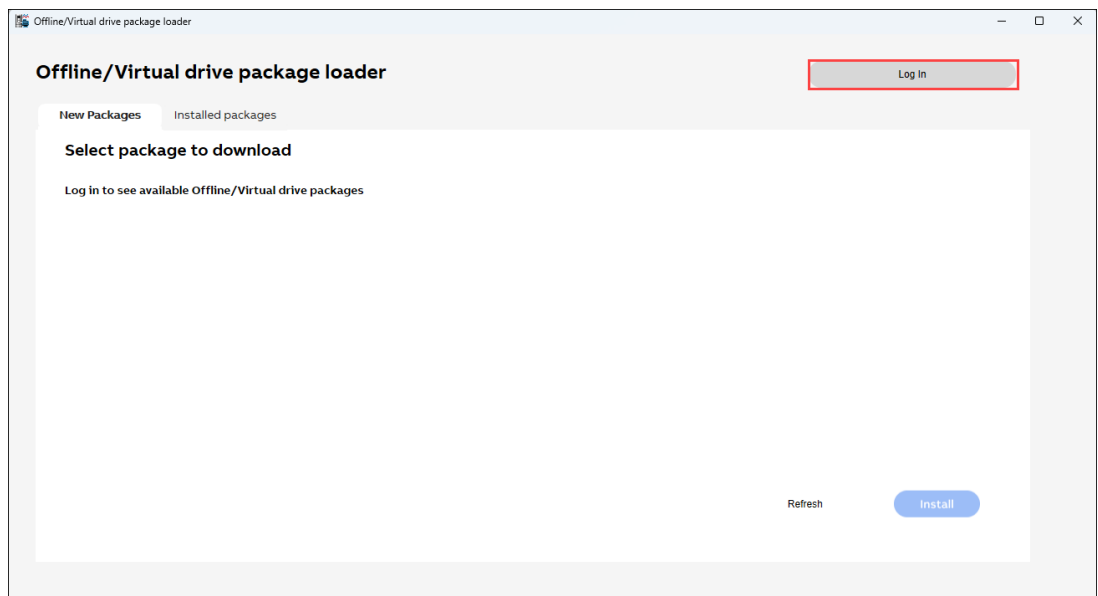
Offline/Virtual drive package loader

You can download and install drive packages from ABB cloud using the Offline/Virtual drive package loader feature. To install the drive packages, do the below steps:

1. Go to **Tools** → **Offline/Virtual drive package loader**.

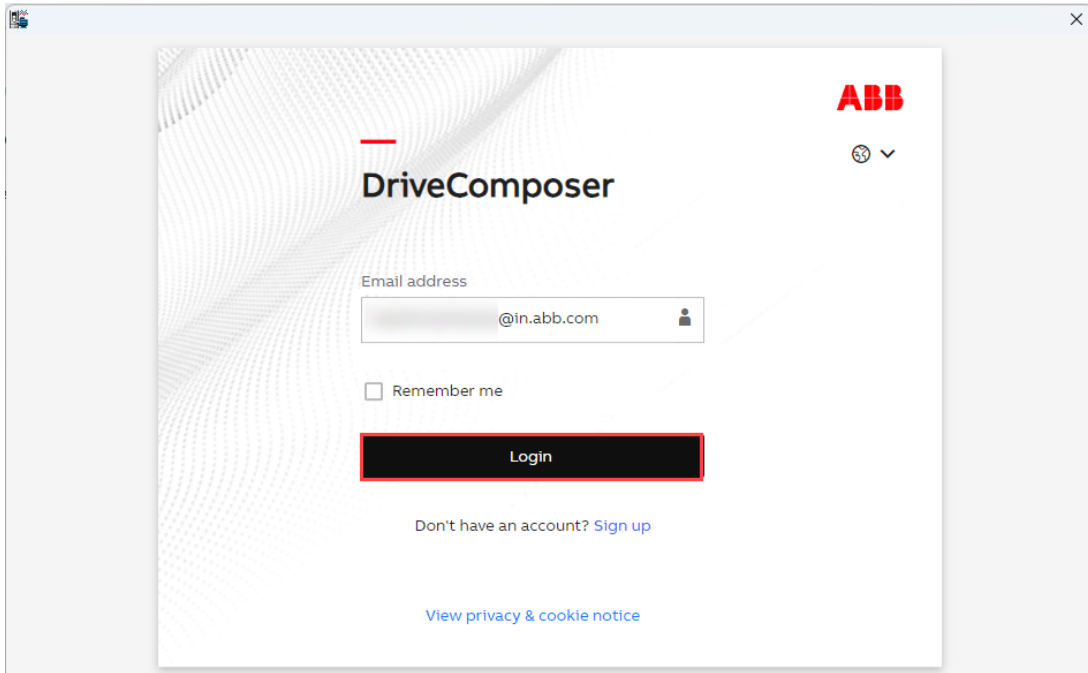


2. In the Offline/Virtual drive package loader window click **Log In**.



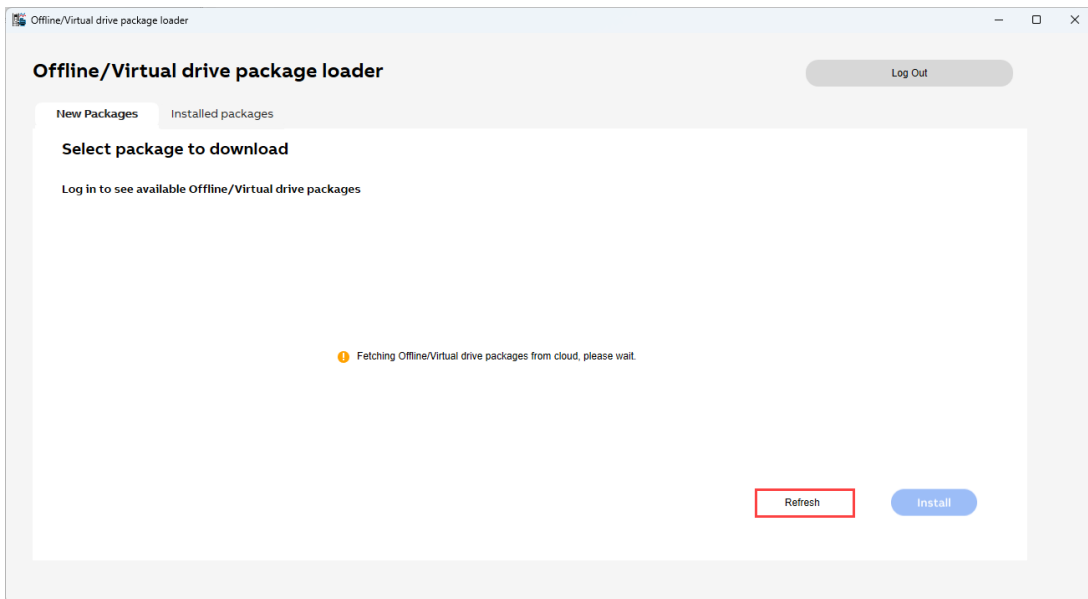
3. In the Customer Identity Access Management (CIAM) login window, enter your ABB email address and click **Login**.

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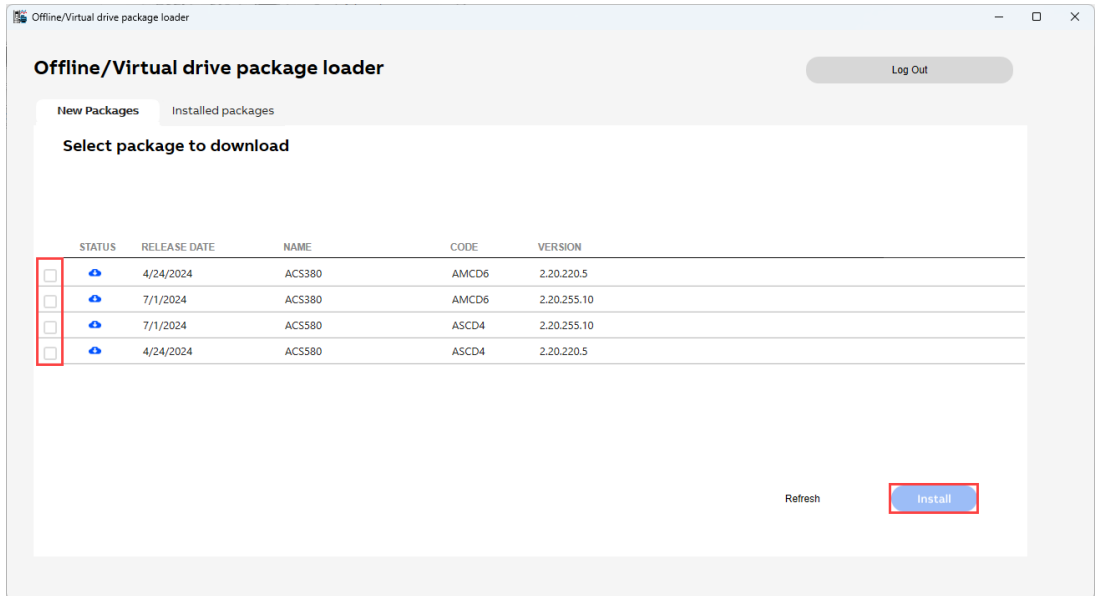


On successful login the Offline/Virtual drive package loader window appears.

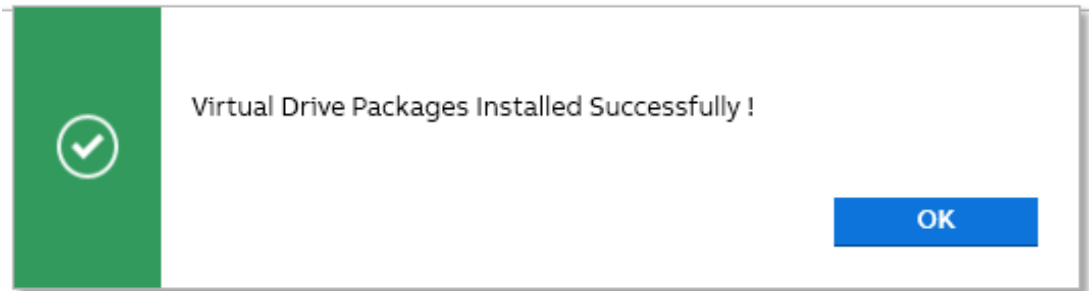
4. To load available packages, click **New Packages** → **Refresh**.



- The available packages are loaded from the cloud. Select the required packages and click **Install** to begin the installation.

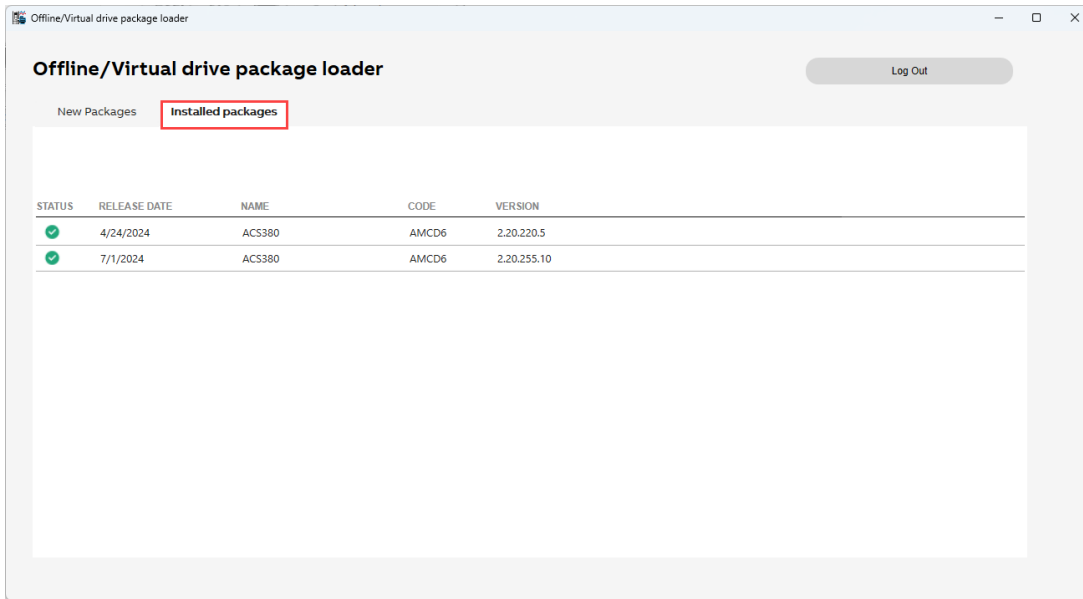


The packages are downloaded from the cloud and installed. If installation is successful, the *Virtual Drive Packages Installed Successfully!* message appears.



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6. To view all installed packages, click **Installed Packages**.



A list of all installed packages appears with details of installation status, release date, package name, code and version. The status appears green if the installed package is active.

You can click x to close the window.

Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/contact-centers.

Product training

For information on ABB product training, navigate to new.abb.com/service/training.

Providing feedback on ABB manuals

Your comments on our manuals are welcome. Navigate to forms.abb.com/form-26567.

Document library on the Internet

You can find manuals and other product documents in PDF format on the Internet at www.abb.com/drives/documents.



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