

Applications

The FX-PCA3613-0 is the controller used with the DX-ADPT-PCA3613 and is a functional replacement for the DX-9100-8454 Series Extended Digital Controller. The adaptor comes with the PCA3613-0 Advanced Application Field Equipment Controller. The PCA3613 controller is a direct replacement for the PCA3611. The DX-9100 series controller was very popular and was used primarily for central plant and air handling unit control. However, the controller's flexible programmability enabled it to be applied to a wide variety of equipment control applications, especially those requiring custom configurations. Also, its onboard real-time clock made it popular for stand-alone equipment control applications.

The FX-PCA3613-0 is capable of using either the N2 or the BACnet® MS/TP communication protocol. You must program the PCA3613 controller with the Controller Configuration Tool (CCT), which has similar, but not identical programming capabilities as the GX-9100. Use Release 10.1 of CCT and later to switch the field bus communications protocol in the PCA to either MS/TP or N2 communications protocol. Johnson Controls® replaced most N2 protocol products with MS/TP protocol products. MS/TP is the default communication protocol for all new controllers. Switchable communication protocols (performed in CCT) provide a cost-effective upgrade and modernization path for customers with existing N2 controllers. See the *Modernization*

Guide for Legacy N2 Controllers - Facility Explorer (LIT-12012045) for controller-specific documentation with installation and commissioning support as well as tips for efficient and safe replacement.

- ① **Note:** The PCA3613 controller has a different dimensional footprint than the existing DX controller (Figure 1). The DX-ADPT-PCA3613 provides a solution for both physical mounting of the replacement PCA in an existing control panel, as well as the re-termination of the inputs and outputs in the same panel based on the location of the terminals on the PCA versus the terminal locations on the DX controller. See [Advantages of the DX-PCA-Adapter](#).

Figure 1: PCA3613 Footprint

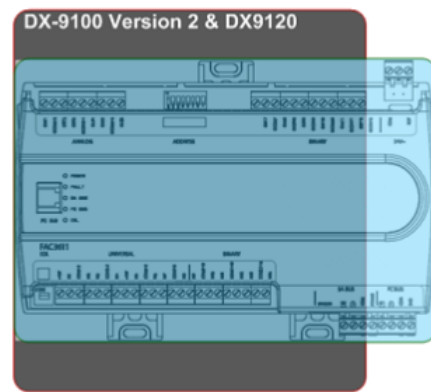


Table 1: DX-9100 and PCA3613 replacement dimensions

Dimension	DX-9100x	PCA3613
Height	200 mm (7.9 in.)	150 mm (5.9 in.)
Width	84 mm (7.2 in.)	220 mm (8.7 in.)
Depth	100 mm (3.9 in.)	57.5 mm (2.3 in.)

Advantages of the DX-ADPT-PCA3613

The DX-ADPT-PCA3613 is sold as a preconfigured assembly with most wires already terminated in the



correct replacement input/output (I/O) terminals on the PCA. Using the adapter has many advantages:

- The adapter uses the existing base of the DX Controller, which does not require the footprint mounting location of the replacement PCA to be changed. The addition of a new panel to meet the physical requirements of the PCA3613 may also be avoided.
- Field wiring is already terminated to the base of the DX controller. Because the base is being reused and not removed from the panel, minimal re-wiring needs to be done. The DX-ADPT-PCA3613 comes with most terminations pre-wired and ready to be assembled. Test sites determined that this feature alone could save several hours of labor for each controller field upgrade.
- This field solution, where the DX Adapter is pre-wired to the PCA controller, reduces or eliminates the chance of wire termination errors.
- The FX-PCA3613-0 field controller replacement used in the assembly is N2-compatible and can be field-converted to N2 from MS/TP with the use of the CCT tool. The controller can then be converted back to MS/TP at a customer-determined date in the future.

Installation

Pre-Assembly notes

Read the following before you install the DX-ADPT-PCA3613:

- Do not use the adapter assembly with the DX-9100 if it was initially installed onto a DIN rail. The adapter requires the use of mounting screws that were used in each corner of the DX base assembly.
- A small number of the early models of the base adapters had a low voltage varistor. Do not use base units with a lot number / date code of 9851 or earlier. This information can be found on a label under the main unit. It may have a prefix of RY1 (and then the four digit date code).
- Installation of the adapter requires the reuse of the DX-9100-8990 base. Be sure that the base unit is in working condition before installing the adapter assembly.
- The original DX-9100-8454 controller had 30 inputs/outputs while the replacement controller has 26 inputs/outputs. An additional terminal block is provided on the circuit board of the adapter to accept the following terminations (DI 7, DI 8, AO 13, AO 14). These points are to be hand-terminated in the field. If these points are required, use a PCX module that is capable of controlling the 2 DIs and 2 AOs remaining from the existing configuration. You can connect these points in a manner that allows the points to be a part of the logic created in the PCA3613.
 - ⓘ **Note:** Depending upon your application, it may be easier to just use the existing wire from the DX base to terminate to the controller. This can be done instead of using the terminal block located under the circuit board. Splicing the wire may be required based on the location of the old to new I/O terminal.
- The adapter is not suitable for use with the DX-9100-8996. This is the base used for door mounting of the controller in the control panel.
- XT/XP modules will need to be replaced with one or more PCX modules. Choose the PCX best suited for your requirements.
 - ⓘ **Note:** A PCX module may need to be added in the panel to accommodate all the points needed from the original DX application.

Parts included

Adapter base with attached FX-PCA3613-0 Controller and pre-installed wiring harnesses.

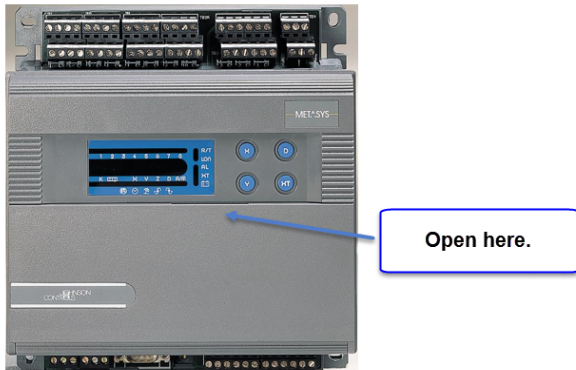
Tools needed

- Medium-sized flat-head screwdriver
- Small flat-head screwdriver

Preparing the DX-9100 Controller for installation and mounting

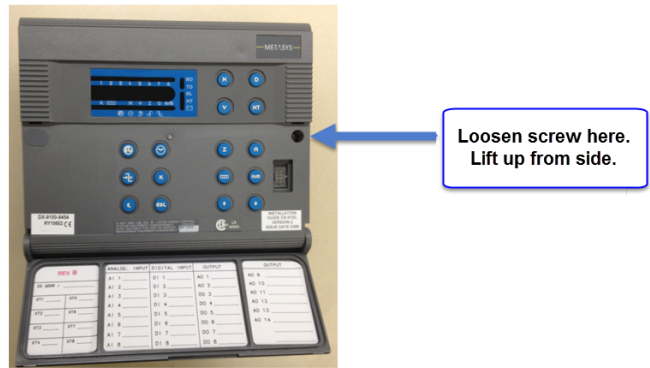
1. Turn off power to the existing DX-9100 controller.
2. Open the lid on the face of controller (Figure 2).

Figure 2: DX-9100 Controller - open lid



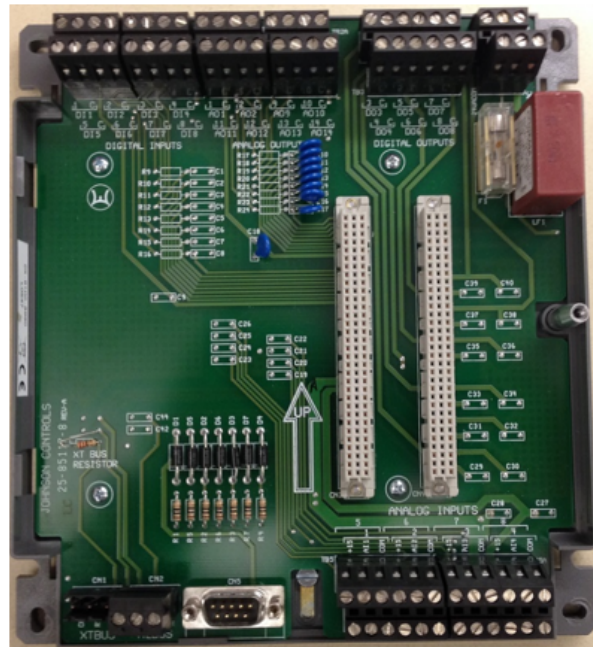
3. Using a medium-sized flat-head screwdriver, loosen the screw on the right side of the controller (Figure 3).
4. Remove the main controller section by first lifting up on the right side of the plastic cover and then lifting the top section off completely.

Figure 3: DX-9100 Controller - remove top section of Controller



5. Leave the base section of the DX-9100 secure in place. The base section is reused with the DX-ADPT-PCA3613 (Figure 4).

Figure 4: DX-9100 Controller - base section (DX-9100-8990)



Wiring

Most connections come pre-terminated through the use of the wiring harnesses. These connections are shown as a reference in Figure 5.

Communication wiring must be terminated directly to the PCA. Power input wiring is required for the PCA in addition to the existing power input wiring used for the base of the DX controller.

Figure 5: Wiring connections

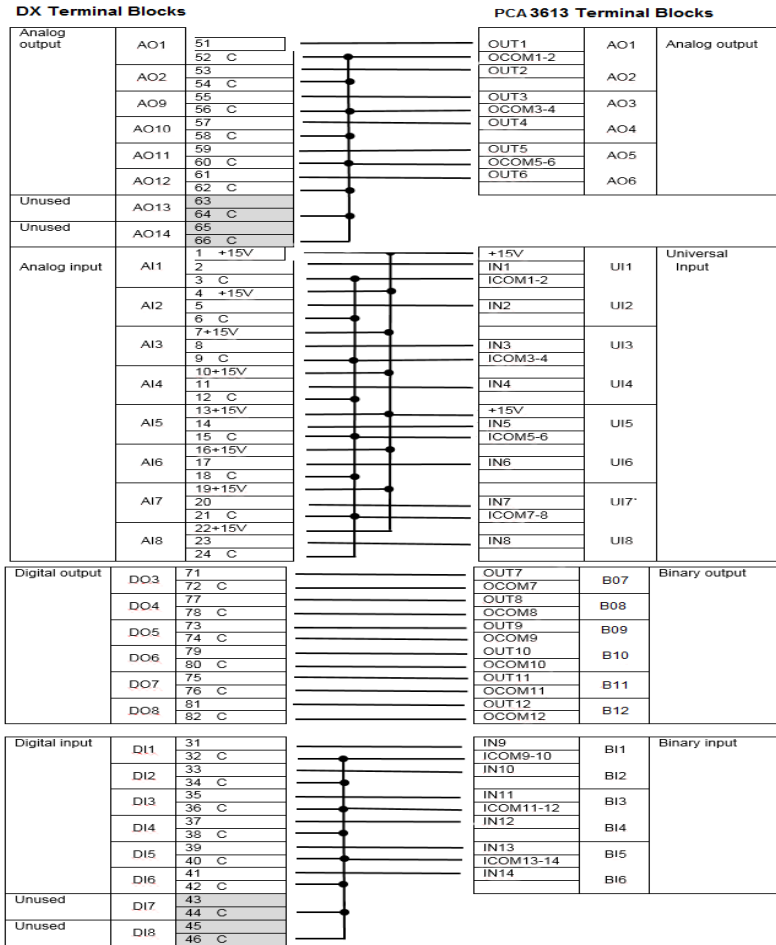
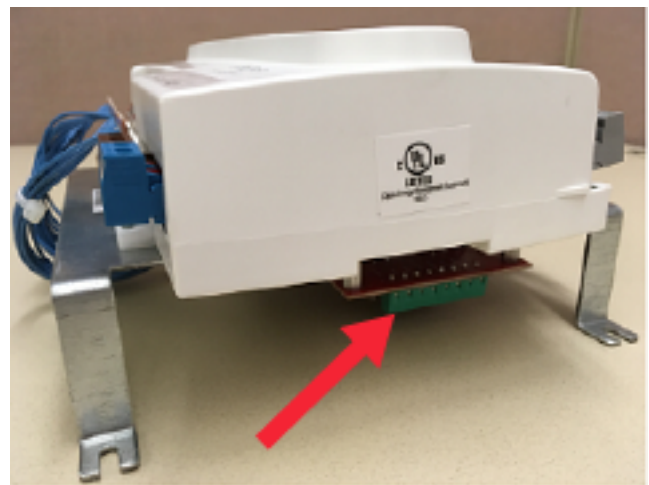


Figure 6: Additional terminal block



The replacement controller has fewer I/O terminal points than the original DX controller, so an additional terminal block is located on the underside of the circuit board to accommodate the extra points Figure 6. This additional terminal block allows for every termination used on the DX controller to be used with the adapter assembly.

- ⓘ **Note:** For most applications, you may use the existing DX mounting base terminal blocks as a termination point for jumper wiring to bring these extra points (Table 2) to PCX modules. This is a simpler solution that does not require terminations to be made to the additional terminal block under the adapter, which have to be made prior to connecting the adapter to the DX base, and are not accessible after installation.

- ⓘ **Note:** The position of the PCA3613 controller on the base adapter may be different than what is shown.

Table 2: Hand-terminated connections

Adapter Terminal Block (TB1)	DX-9100 Terminal Number
DI8COM	46
DI8	45
DI7COM	44
DI7	43
AO14COM	66

Table 2: Hand-terminated connections

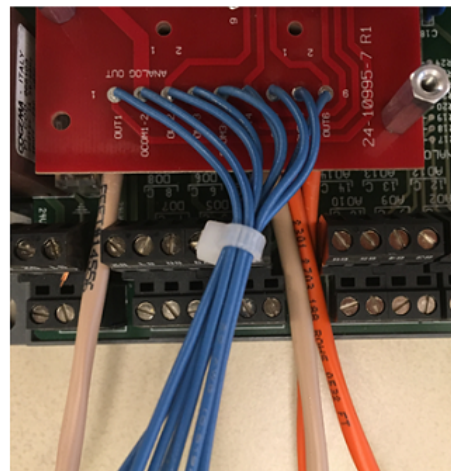
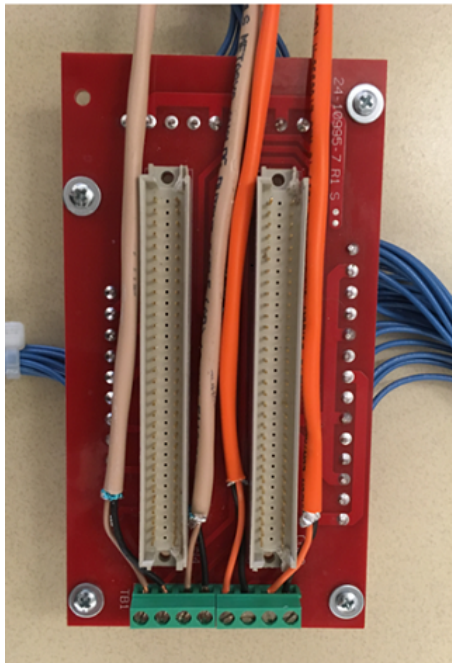
Adapter Terminal Block (TB1)	DX-9100 Terminal Number
AO14	65
AO13COM	64
AO13	63

Table 3: Terminal block I/O

Terminal block I/O									
Termination	8C	8	7C	7	14C	14	13C	13	TB1

ⓘ **Note:** TB1 is referenced on the circuit board to help determine I/O position and is not a termination.

Figure 7: Hand terminated connection examples



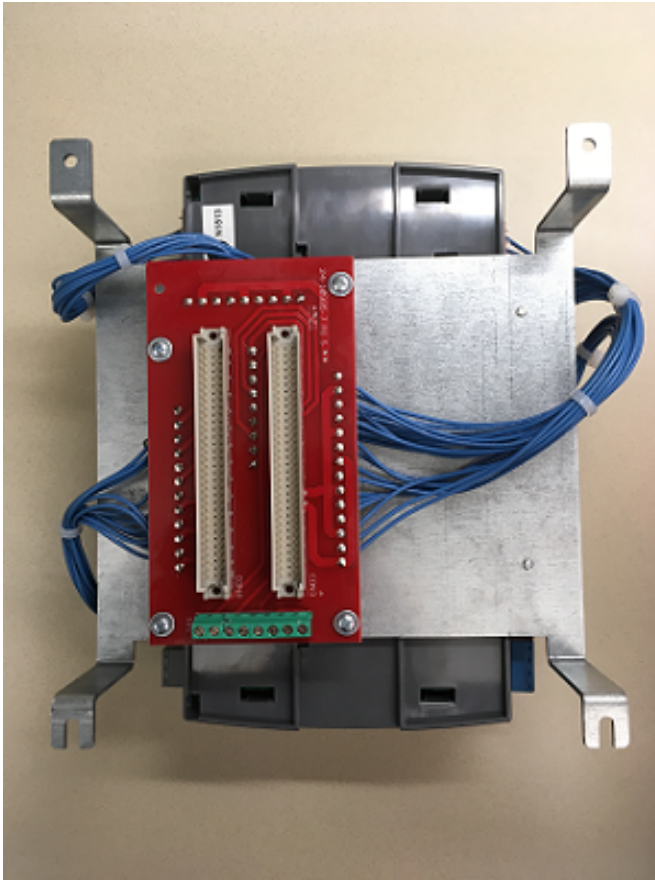
Mounting the DX-ADPT-PCA3613

ⓘ **Note:** See [Wiring](#) prior to mounting the adapter.

1. Remove the existing four corner screws holding the current DX-9100-8900 base unit. Be sure to keep the base unit in its same current position (Figure 8).
2. Keep the screws for reuse.
3. Locate the two main pin connectors on the bottom of the adapter (Figure 8) and align them to the connectors of the DX-9100 base unit.
4. Be sure that the mounting connections of each corner of the metal bracket are aligned correctly with the mounting screws of the corners of the DX base unit when the terminal block sections are lined up. See Figure 8 for a representation of the terminal blocks on the adapter.

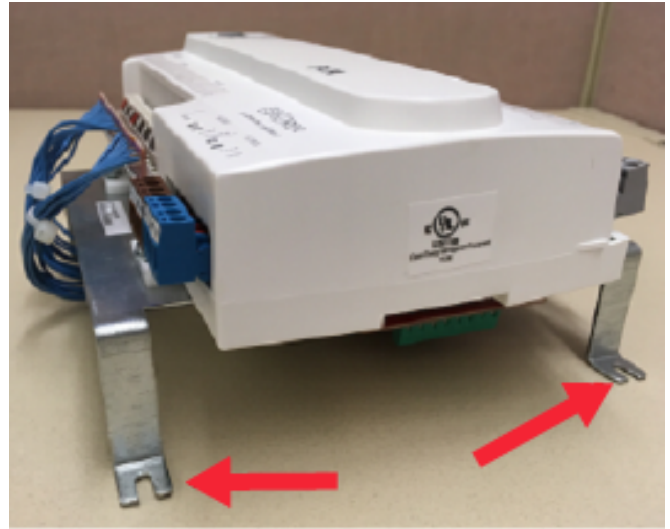
- ① **Note:** Figure 8 resembles the underside of the adapter.

Figure 8: Terminal blocks on adapter (underside view)



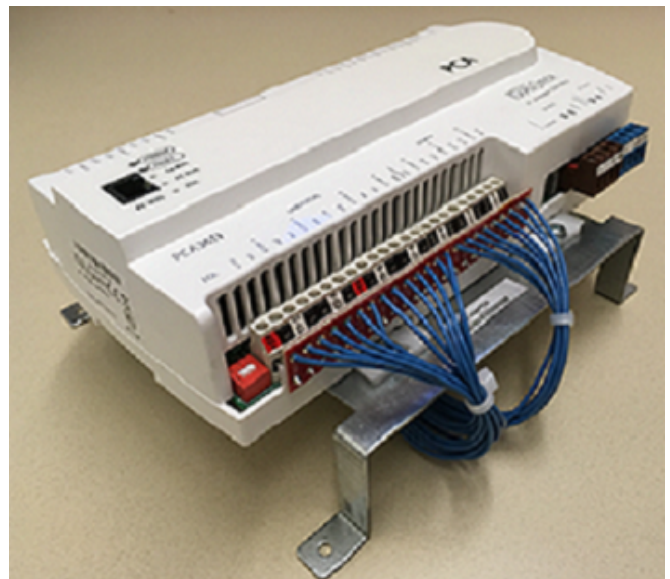
- ① **Note:** The position of the PCA3613 controller on the base adapter may be different than what is shown.
5. Press the bracket assembly firmly into place. Be sure that all the pins are aligned correctly.
 6. Reinstall the four corner screws. Fasten down the adapter to the base of the DX controller. Do not over-tighten the screws. See Figure 9 Figure 10.

Figure 9: Reinstall and tighten screws



Once the adapter assembly is mounted to the base of the DX controller, the unit should resemble the following photo:

Figure 10: Adapter mounted to the base of DX Controller



- ① **Note:** The position of the PCA3613 controller on the base adapter may be different than what is shown.

Programming the PCA3613

The FX-PCA3613 is capable of using either N2 or the MS/TP communication protocol. Use Release 10.1 of CCT and later to switch the field bus communications protocol in the PCA to either MS/TP or N2 communications protocol. MS/TP is the default communication protocol for all new

controllers. Switchable communication protocols (performed in CCT) provide a cost-effective upgrade and modernization path for customers with existing N2 controllers. You must program the PCA3613 controller with CCT, which has similar, but not identical programming capabilities as GX-9100. See the *Modernization Guide for Legacy N2 Controllers - Facility Explorer (LIT-12012045)* for controller-specific documentation for installation and commissioning support as well as tips for efficient and safe replacement.

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Single point of contact

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