Installation Instructions

Digital Expansion D-Shell Module CompactBlock LDX I/O

(Cat. Nos. 1790-16BV0X, -8BV8VX, -8BV8BX, -0B16X, -0V16X, -0W8X)

What This Document Describes

This document describes how to install your CompactBlock LDX I/O expansion modules.

Publication 1790-IN003A-EN-P - April 2001

European Union Directive Compliance

If this product has the CE mark, it is approved for installation within the European Union and EEA regions and it has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) and the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC - Generic Emission Standard, Part 2 - Industrial Environment
- EN 50082-2 EMC - Generic Immunity Standard, Part 2 - Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the Allen-Bradley publication Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Open style devices must be provided with environmental and safety protection by proper mounting in enclosures designed for specific application conditions. See NEMA Standards publication 250 and IEC publication 529, as applicable, for explanations of the degrees of protection provided by different types of enclosures.

Installing CompactBlock LDX I/O

Follow these steps to install the expansion module:

1. Mount the module.
2. Connect an expansion module to a base module.
3. Wire the D-Shell connectors.
4. Troubleshoot with the indicators.

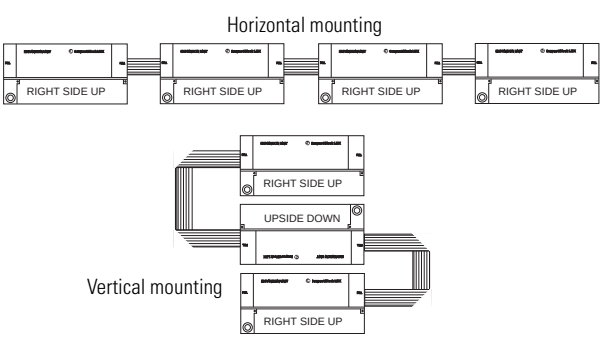
These steps are explained in detail in the following sections.

Mount the Expansion Module

Mount the expansion module and connect it to a previously-installed CompactBlock LDX I/O base or expansion

Beginning with the base module, you can mount your CompactBlock LDX I/O modules either horizontally or vertically:

- horizontally (left to right) - add expansion modules in a end-to-end configuration
- vertically (up or down) - add expansion modules either up or down in a back-to-back configuration. In this configuration, you must use the optional 15cm ribbon cable (1790-15CMCBL) and alternately position the modules in a right-side up, upside-down fashion.



You can mount your modules on a panel or DIN rail as described in the following section.

Panel Mounting

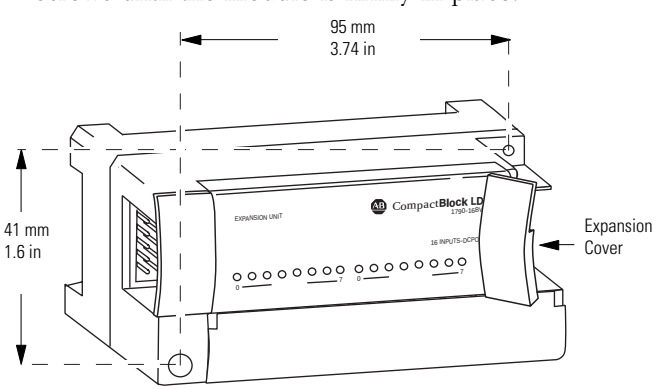
1. On the panel, position the module next to your previously-installed module.

2. Gently pull and position the expansion covers inward.

3. Place a center punch, nail or similar device through the mounting holes in the module (lower left and upper right corners of the module) and make two marks on the panel.

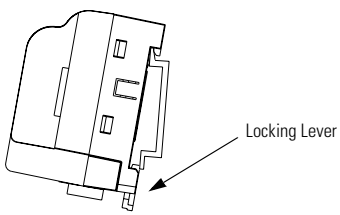
4. Remove the module and drill two holes in the panel to accommodate each of the mounting screws.

5. Replace the module on the panel and place a screw through each of the two mounting holes. Tighten the screws until the module is firmly in place.



DIN Rail Mounting

1. On the DIN rail, postion the expansion module next to your previously-installed module.
2. Hook the top of slot of the module over the DIN rail.
3. Pull down on the locking lever while pressing the module against the rail.



4. Push up on the locking lever when module is flush against the rail. This secures the module to the rail .

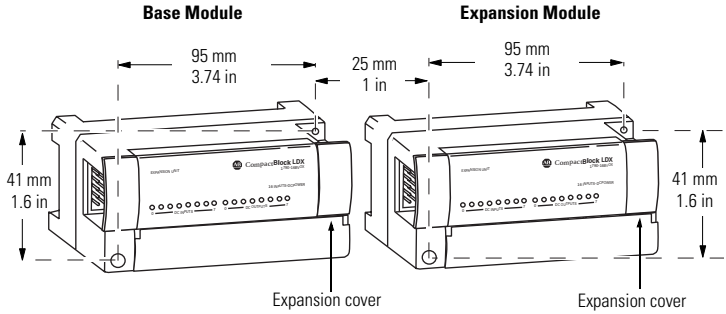
Connecting an Expansion Module to a Base Module

ATTENTION

Expansion modules should not be installed when power is applied to the base.

1. Pull and postion the expansion covers inward on both the base and expansion modules.

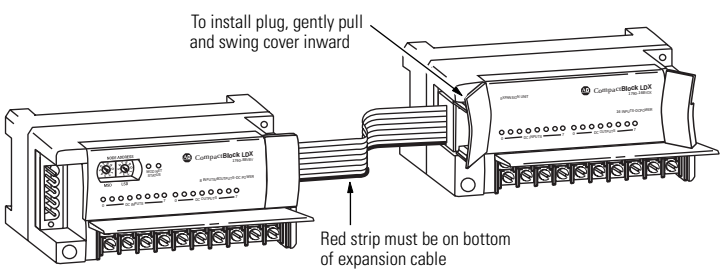
2. Position the expansion module with proper spacing.



3. Mount the expansion module using panel or DIN rail mounting, as described in the previous section.

4. Plug the expansion cable into the base and expansion modules.

IMPORTANT The expansion cable can only be connected to the modules so that the red stripe on the cable is on the bottom as shown below.

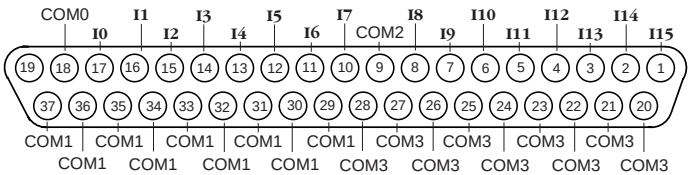


5. Replace the expansion covers on all modules.

Wiring the D-Shell Connectors

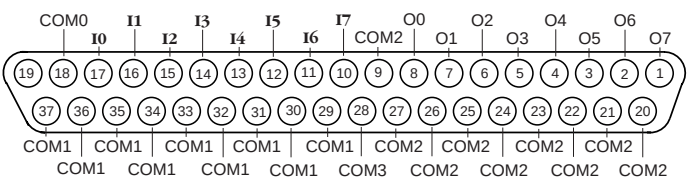
The following figures show the wiring information for the D-Shell connectors.

1790-16BVOX Input Module Wiring Diagram for D-Shell Connector



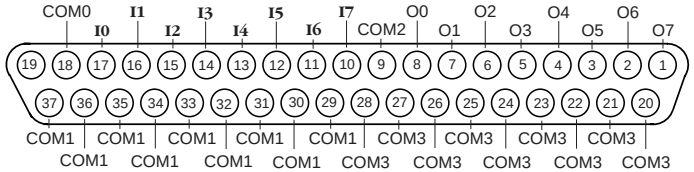
- **For inputs 0-7: Sinking inputs** - wire Com 1 to Field Power (+) 24V dc, wire Com 0 to Field Power (-) GND
  Sourcing inputs - wire Com 1 to Field Power (-) GND, wire Com 0 to Field Power (+) 24V dc
- **For inputs 8-15: Sinking inputs** - wire Com 3 to Field Power (+) 24V dc, wire Com 2 to Field Power (-) GND
  Sourcing inputs - wire Com 3 to Field Power (-) GND, wire Com 2 to Field Power (+) 24V dc
  Note: All Com 1 and Com 3 are internally connected - Com 1 is used for inputs 0-7, Com 3 is used for inputs 8-15.

1790-8BV8VX Input/Output Module Wiring Diagram for D-Shell Connector



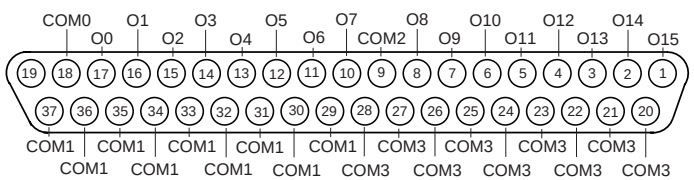
- **Sinking inputs** - wire Com 1 to Field Power (+) 24V dc, wire Com 0 to Field Power (-) GND
  Sourcing inputs - wire Com1 to Field Power (-) GND, wire Com 0 to Field Power (+) 24V dc
  Note: all Com 1 are internally connected.
- **Sinking outputs** -wire Com 2 to Field Power (+) 24Vdc, wire Com 3 to Field Power (-) GND
  Note: all Com 2 are internally connected.

1790-8BV8BX Input/Output Module Wiring Diagram for D-Shell Connector



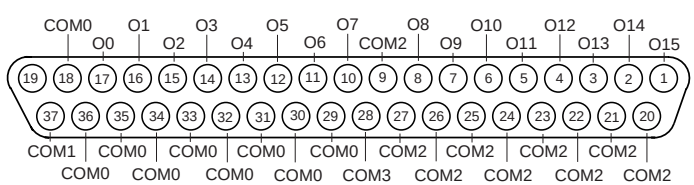
- **Sinking inputs** - wire Com 1 to Field Power (+) 24V dc, wire Com 0 to Field Power (-) GND
  Sourcing inputs - wire Com1 to Field Power (-) GND, wire Com 0 to Field (+) 24V dc
  Note: all Com 1 are internally connected.
- **Sourcing outputs** -wire Com 2 to Field Power (+) 24Vdc, wire Com 3 to Field Power (-) GND
  Note: all Com 3 are internally connected.

1790-0B16X Output Module Wiring Diagram for D-Shell Connector



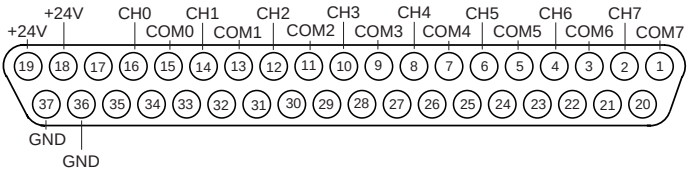
- **Sourcing outputs** - wire Com 0 and Com 2 to Field Power (+) 24V dc, wire Com 1 and Com 3 to Field Power (-) GND
  Note: all Com 1 and Com 3 are internally connected.

1790-0V16X Output Module Wiring Diagram for D-Shell Connector



- **Sinking outputs** - wire Com 0 and Com 2 to Field Power (+) 24V dc, wire Com 1 and Com 3 to Field Power (-) GND
  Note: all Com 0 and Com 2 are internally connected.

1790-0W8X Relay Output Module Wiring Diagram for D-Shell Connector



- Wire pins 18 and 19 to Field Power (+) 24Vdc
  Wire pins 36 and 37 to Field Power (-) GND

Troubleshoot with the Indicators

Use the I/O status indicators to troubleshoot your module:.

I/O Status Indicators			
Function:	**LED Color:**	**Module Illumination:**	**Condition:**
Outputs	Each output: Green	None Green	Output not energized Output energized
Inputs	Each Input: Green	None Green	No valid input Valid input

Digital Expansion D-Shell Module Specifications

The following table contains specifications that are common to all of the expansion modules in this document. Individual module specifications are detailed after this table.

Environmental Specifications	
Operating Temperature	0 to 55°C (32 to 140°F)
Non-Operating Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5-90% non-condensing
Operating Altitude	2000m
Shock Operating	10g
Non-operating	30g
Vibration	2g @ 10-500Hz, 0.012 inch p-p from 10-57Hz
Mounting	DIN rail or screw
Dimensions	52x104x42mm (2.03x4.07x1.64in)
Weight	0.3lb (0.1kg)
General Specifications	
Wiring Category	2[1]
Product Certifications (when product or packaging is marked)	Hazardous Class I, Div 2 - Groups A,B,C,D[2] Marked for all applicable directives Marked for all applicable acts

[1] Refer to publication 1770-4.1, *Programmable Controller Wiring and Grounding Guidelines.*

[2] UL approved for use as part of Class 2 circuit only.

Universal DC Input Module Specifications

1790-16BV0X	
Inputs per module	16 points, sinking or sourcing
On-state voltage	9.6V dc minimum 24V dc nominal 28.8V dc maximum
Off-state voltage	5.0V dc maximum
On-state current	8mA maximum per channel @ 28.8V dc
Nominal input impedance	4.8KΩ
Indicators	16 green input status
Common type	8 points/8COM (non-polarity)
General Specifications	
Isolation	I/O to logic: photocoupler isolation Isolation voltage: 1250V ac rms
Wiring	37-pin D-Shell connector
Field Power	Power dissipation - 3.68W @ 28.8V dc

DC Input/Output Combination Module Specifications

1790-8BV8VX, -8BV8BX	
INPUT SPECIFICATIONS	
Inputs per module	8 points non-isolated, sinking or sourcing
On-state voltage	9.6V dc minimum 24V dc nominal 28.8V dc maximum
On-state current	8mA maximum per point @ 28.8V dc
Off-state voltage	5V dc maximum
Nominal input impedance	4.8KΩ
Indicators	8 green status
Common type	8 points/8COM (non-polarity) - 1790-8BV8VX 8 points/8COM (non-polarity) - 1790-8BV8BX
OUTPUT SPECIFICATIONS	
Outputs per module	8 points non-isolated, sinking - 1790-8BV8VX 8 points non-isolated, sourcing - 1790-8BV8BX
On-state voltage	10V dc minimum 24V dc nominal 28.8V dc maximum
On-state voltage drop	0.5V dc maximum
On-state current	1mA minimum per channel
Off-state leakage	0.5mA maximum
Output signal delay	Off to On: 0.5ms maximum On to Off: 1.0ms maximum
Indicators	8 green status
Output current rating	Maximum 0.5A per output 4.0A maximum per common
Common type	8 points/8COM - 1790-8BV8VX 8 points/8COM - 1790-8BV8BX
Field Power	Supply voltage - 24V dc nominal Voltage range - 10-28.8V dc Power dissipation - 3.22W @ 28.8V dc

General Specifications	
Isolation	I/O to logic: photocoupler isolation Isolation voltage: 1250V ac rms
Wiring	37-pin D-Shell connector

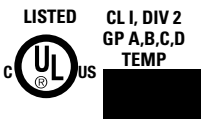
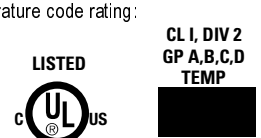
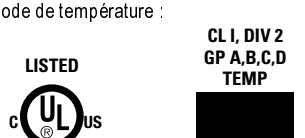
DC Output Module Specifications

1790-OV16X and -OB16X	
Outputs per module	16 points non-isolated, sinking: 1790-0V16X 16 points non-isolated, sourcing: 1790-0B16X
On-state voltage	10V dc minimum 24V dc nominal 28.8V dc maximum
On-state voltage drop	0.5V dc maximum
On-state current	1mA minimum per channel
Off-state voltage	28.8V dc maximum
Off-state leakage	0.5mA maximum
Output signal delay	Off to On: 0.5ms maximum On to Off: 1.0ms maximum
Indicators	16 green status
Output current rating	Maximum 0.5A per output 4.0A maximum per common
Common type	8 points/2COM for 1790-OV16X 8 points/8COM for 1790-0B16X
General Specifications	
Field Power	Supply voltage - 24V dc nominal Voltage range - 10-28.8V dc Power dissipation - 2.76W @ 28.8V dc
Isolation	I/O to logic: photocoupler isolation Isolation voltage: 1250V ac rms
Wiring	37-pin D-Shell connector

AC/DC Relay Output Module Specifications

1790-0W8X	
Relay type	Form A, normally open Single pole, single throw
Output voltage range (load dependent)	5-24V dc @ 2.0A resistive 30V ac @ 2.0A resistive
Output current rating (at rated power)	2.0A @ 5-24V dc resistive 2.0A @ 30V dc resistive
Minimum load	100µA, 100mV dc per input
Maximum on-state voltage drop	0.5V @ 2.0A, resistive load, 24V dc
Initial Contact Resistance	30m ohm
Expected contact life	300K cycles resistive 100K cycles inductive
Maximum off-state leakage	1.5mA maximum
Output delay time	10ms maximum on to off or off to on
Indicators	8 green status
Common type	1 point/1COM
General Specifications	
Field Power	Supply voltage - 24V dc nominal Voltage range - 19.2-28.8V dc Power dissipation - 2.3W @ 28.8V dc
Isolation	I/O to logic: photocoupler isolation Isolation voltage: 1250V ac rms
Wiring	37-pin D-Shell connector

Important: Input and output wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction.

C-UL and UL Hazardous Location Approval	**Approbation d'utilisation dans des environnements dangereux par la C-UL and UL**
C-UL and UL certifies products for general use as well as for use in hazardous locations. **Actual C-UL and UL certification is indicated by the product label** as shown below, and not by statements in any user documentation.	La C-UL and UL certifie des produits pour une utilisation générale aussi bien que pour une utilisation en environnements dangereux. La certification C-UL and UL en vigueur est indiquée par l'étiquette produit et non par des indications dans la documentation utilisateur.
Example of the C-UL and UL certification product label: 	Exemple d'étiquette de certification d'un produit par la C-UL and UL : 
To comply with C-UL and UL certification for use in hazardous locations, the following information becomes a part of the product literature for this C-UL and UL-certified industrial control product. This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only. The products having the appropriate C-UL and UL markings (that is, Class I, Division 2, Groups A, B, C, D) are certified for use in other equipment where the suitability of combination (that is, application or use) is determined by the C-UL and UL or the local inspection office having jurisdiction Peripheral equipment must be suitable for the location in which it is used.	EPour satisfaire à la certification C-UL and UL en environnements dangereux, les informations suivantes font partie intégrante de la documentation des produits de commande industrielle certifiés. Cet équipement ne convient qu'à une utilisation dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux. Les produits portant le marquage C-UL and UL approprié (c'est-à-dire Classe I, Division 2, Groupes A, B, C, D) sont certifiés pour une utilisation avec d'autres équipements, les combinaisons d'applications et d'utilisation étant déterminées par la C-UL and UL ou le bureau local d'inspection. L'équipement périphérique doit convenir à l'emplacement d'utilisation.
Due to the modular nature of a programmable control system, the product with the highest temperature rating determines the overall temperature code rating of a programmable control system in a Class I, Division 2, location. The temperature code rating is marked on the product label as shown.	De par la nature modulaire des systèmes de commande programmables, le produit ayant le code de température le plus élevé détermine le code de température global du système dans un environnement de Classe I, Division 2. Le code de température est indiqué sur l'étiquette produit.
Temperature code rating:  Look for temperature code rating here.	Code de température :  Le code de température est indiqué ici.

The following warnings apply to products having C-UL and UL certification for use in hazardous locations.	Les avertissements suivants s'appliquent aux produits ayant la certification C-UL and UL pour une utilisation dans des environnements dangereux.
WARNING: Explosion Hazard Substitution of components may impair suitability for Class I, Division 2. Do not replace components unless power has been switched off or the area is known to be non-hazardous. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous. Do not disconnect connectors unless power has been switched off or the area is known to be non-hazardous. Secure any user-supplied connectors that mate to external circuits on this equipment by using screws, sliding latches, threaded connectors, or other means such that any connection can withstand a 15 Newton (3.4 lb.) separating force applied for a minimum of one minute. Batteries must only be changed in an area known to be non-hazardous.	**AVERTISSEMENT : Risque d'explosion** La substitution de composants peut rendre ce matériel inadapté à une utilisation en environnement de Classe I, Division 2. Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de remplacer des composants. Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs fournis par l'utilisateur pour se brancher aux circuits externes de cet appareil à l 'aide de vis, loquets coulissants, connecteurs filetés ou autres, de sorte que les connexions résistent à une force de séparation de 15 Newtons (1,5 kg - 3,4 lb.) appliquée pendant au moins une minute. S'assurer que l'environnement est classé non dangereux avant de changer les piles.
C-UL and UL logo is a registered trademark of the Underwriters Laboratories.	Le sigle C-UL and UL est une marque déposée de la Underwriters Laboratories.

This product has been tested at an Open Device Vendors Association, Inc. (ODVA) authorized independent test laboratory and found to comply with ODVA Conformance Test. Please contact the ODVA website (http://www.odva.org) for listing of products tested by ODVA independent test labs for further details.

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