# Compact Modular Valves

*Unit assembly shows Compact Modular Valve bank with EIP Module attached.*

*Unit assembly shows Compact Modular Valve bank with D-Sub Module attached.*

NITRA compact modular valves are the ideal solution for those requiring the unbeatable performance, flexibility and modularity of multiple valves combined with sturdy mechanics and a high degree of protection. Each valve is enclosed in a reinforced technopolymer (Celcon®) protective shell that acts as a shock-absorber and prevents the infiltration of dirt. The smooth, rounded design makes the system ideal for applications requiring frequent washing. All the pneumatic connections are on one side, with built-in push-to-connect fittings. The systems offer a variety of flexibility from one to 16 solenoids. Valves can be mixed to use tubing of different sizes and can be individually replaced. The electrical signals are relayed from one valve to the next by gold-plated contacts so the electrical connections are entirely automatic. Both EtherNet/IP or 25-pin D-Sub connector electrical connections are available (Ethernet models require a separate power cable and include a ground strap). Inlet/exhaust end plates and intermediate modules provide flexibility to operate valve banks at vacuum or dual pressures.

## Building the Valve Bank:

### Step 1. Select the control interface: EtherNet/IP or D-Sub connector.

### Step 2. Determine operating pressure and volume.

- Single input/pilot: 45-100 psi, Cv = 12.4
- Duel inlet: vacuum-145 psi, Cv = 12.4 or 16.6; Pilot: 45-100 psi
- Right end dual: vacuum-145 psi, Cv = 16.6


*Click on the thumbnail or go to https:///VID-PN-0040 for a short video on Selecting CMV Valve Components*

### Step 3. Choose Valves:

- 3-way –> (2) Separate valves per module
- 5-way –> 2-position or 3-position

NOTE: Maximum (16) solenoids (not valves) per bank

### Step 4. (Optional) Choose intermediate module

- Through - Adds an inlet and exhaust, others pass thru
- Blind - Blocks inlets from left, adds (2) inlets that feed to the right, and splits a bank into (2) smaller banks.
- Exhaust - Adds an exhaust port, others pass thru

# Compact Modular Valves

## Compact Modular Valves - End Plates

One left and one right end plate is required per manifold. For continuous flow that will exceed the Cv of the end plates, consider adding an intermediate plate.

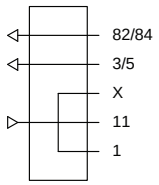



**Diagram "A"**

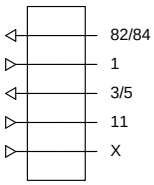



**Diagram "B"**

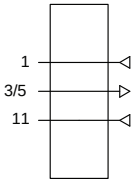



**Diagram "C"**

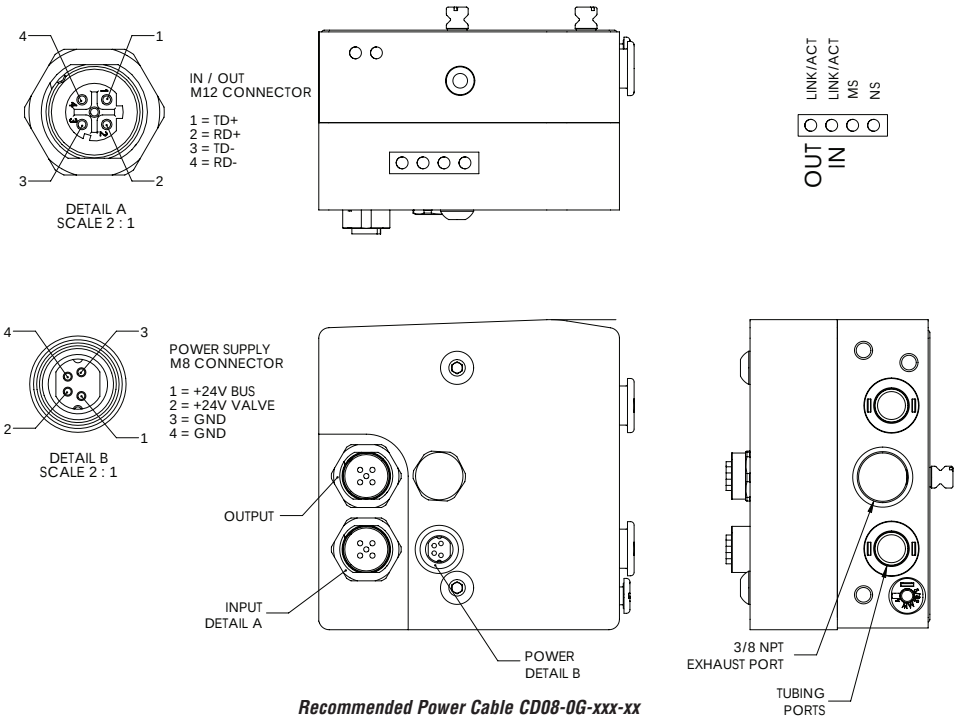
| Compact Modular Valve - End Plates | | | | | | |
|---|---|---|---|---|---|---|
| ***Item*** | ***Part No.*** | ***Price*** | ***Description*** | ***Diagram*** | ***Operating Pressure*** | ***Weight (lbs)*** |
|  | ***CMV-E1X-4X*** | | NITRA pneumatic EtherNet/IP enabled modular plate, left supply/exhaust end, Cv=12.4, 3/8in push-to-connect tubing inlet(s), 3/8in female NPT exhaust(s), anodized aluminum body. | A | 45-100 psi | 1.0 |
|  | ***CMV-E2X-4X*** | | NITRA pneumatic EtherNet/IP enabled modular plate, left supply/exhaust end, Cv=12.4, (2) 3/8in push-to-connect tubing inlet(s), 3/8in female NPT exhaust(s), 5/32in (4mm) push-to-connect tubing pilot(s), anodized aluminum body. | B | vacuum-145 psi | 1.0 |
|  | ***CMV-C1X-4X*** | | NITRA pneumatic modular plate, left supply/exhaust end, Cv=12.4, 3/8in push-to-connect tubing inlet(s), 3/8in female NPT exhaust(s), anodized aluminum body. | A | 45-100 psi | 0.8 |
|  | ***CMV-C2X-4X*** | | NITRA pneumatic modular plate, left supply/exhaust end, Cv=12.4, (2) 3/8in push-to-connect tubing inlet(s), 3/8in female NPT exhaust(s), 5/32in (4mm) push-to-connect tubing pilot(s), anodized aluminum body. | B | vacuum-145 psi | 0.8 |
|  | ***CMV-C2X-5X*** | | NITRA pneumatic modular plate, left supply/exhaust end, Cv=16.6, (2) 1/2in push-to-connect tubing inlet(s), 3/8in female NPT exhaust(s), 5/32in (4mm) push-to-connect tubing pilot(s), anodized aluminum body. | B | vacuum-145 psi | 0.8 |
|  | ***CMV-C3X-5X*** | | NITRA pneumatic modular plate, right supply/exhaust end, Cv=16.6, (2) 1/2in push-to-connect tubing inlet(s), 3/8in female NPT exhaust(s), anodized aluminum body. | C | vacuum-145 psi | 1.4 |
|  | ***CMV-C4X*** | | NITRA pneumatic modular plate, right blind end, anodized aluminum body. | N/A | N/A | 0.5 |

# Compact Modular Valves

| EtherNet/IP Enabled Modular End Plate Specifications | |
|---|---|
| ***Field Buses*** | EtherNet/IP (IO/Explicit Messaging) - 10/100 Mbit/s<br>Half-duplex - Full-duplex<br>Supports Auto-Negotiation |
| ***Factory Settings*** | Module name CMV series - Address IP 192.168.192.30 |
| ***Addressing*** | Software DHCP/BOOTP |
| ***Voltage Range*** | 24VDC ±10% |
| ***Maximum Number of Solenoids (out)*** | 16 |
| ***Maximum Number of Valves*** | 16 |
| ***ICC Bus Supply Current*** | Nominal Icc 120mA<br>Instantaneous Icc (< 2ms) 450mA |
| ***Maximum Absorption of a Valve Distribution (black with 16 mono-stable valves)*** | Nominal Icc with 120mA OFF valves<br>Nominal Icc with 580mA ON valves |
| ***Protections*** | Module protected against overload and polarity reversal.<br>Outputs protected against overloads and short-circuits. |
| ***Connections*** | Field bus: (2) M12 Female, D-coded, internal switch<br>Supply: M8 4-pin |
| ***Data Bit Value*** | 0 = not enabled<br>1 = enabled |
| ***Output Status in the Absence of Communication*** | Not enabled |
| ***Approvals*** | N/A |

***Note: For EtherNet/IP communication use a quality Cat5e straight through Ethernet cable such as AutomationDirect CAB-ETH-M0x patch cables. See our Communication Products section online at***

## Wiring and Ports

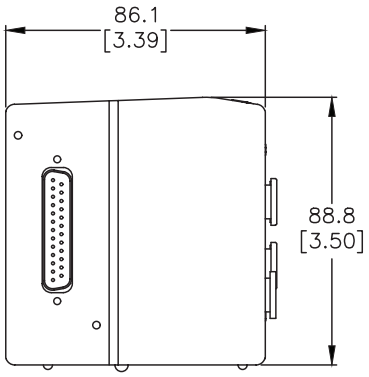


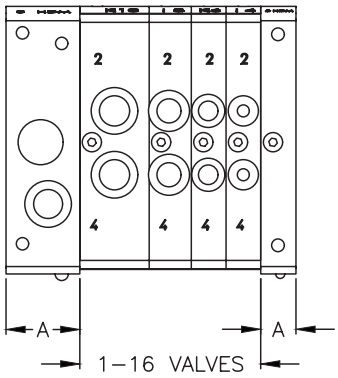

***Recommended Power Cable CD08-0G-xxx-xx***

# Compact Modular Valves

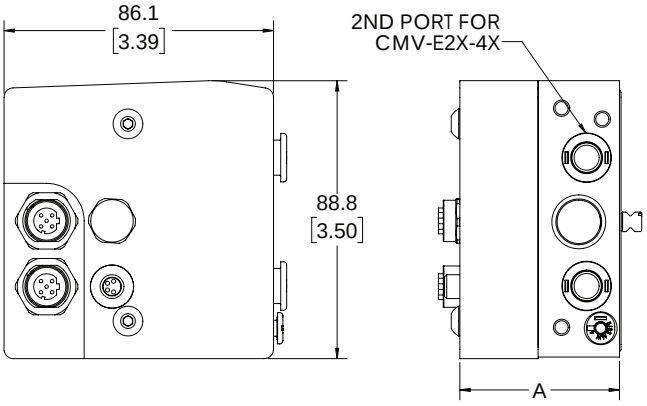
## Dimensions

**mm [inches]**




| DIM TABLE | |
|---|---|
| PART NO. | DIM A |
| CMV–E1X–4X | 51.0 [2.01] |
| CMV–E2X–4X | 51.0 [2.01] |
| CMV–C1X–4X | 24.5 [0.96] |
| CMV–C2X–4X | 24.5 [0.96] |
| CMV–C2X–5X | 24.5 [0.96] |
| CMV–C3X–5X | 32.0 [1.25] |
| CMV–C4X | 11.7 [0.46] |




***See our website for complete Engineering drawings.***

# Compact Modular Valves

## Features:

- Mix valve sizes as needed
- (2) 3/2, 5/2 and 5/3 valves available
- Single solenoid spring return or dual solenoids per valve
- Up to 16 valves (16 solenoids max) per manifold
- Locking manual operator
- IP65
- NBR / Buna-N gaskets and O-ring
- Surge Suppression - TRANSIL™ TVS (Transient Voltage Surge Suppressor)
- 2 year warranty

**Diagram "A"**
**(2) 3-way, 2-pos, Single Solenoids, N.C.**

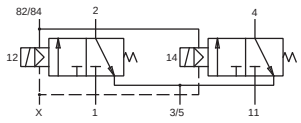



**Diagram "B"**
**(2) 3-way, 2-pos, Single Solenoids, N.O.**

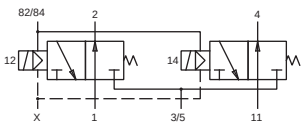



**Diagram "C"**
**(2) 3-way, 2-pos, Single Solenoids, N.C./N.O.**

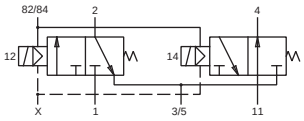



**Diagram "D"**
**5-way, 2-pos, Single Solenoid**

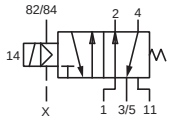



**Diagram "E"**
**5-way, 2-pos, Double Solenoid**

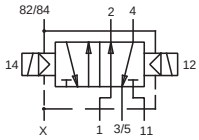
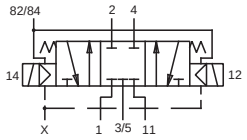



**Diagram "F"**
**5-way, 3-pos, Double Solenoid, Center Closed**




| Compact Modular Valve Specifications | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Models*** | ***CMV-A1L-1A*** | ***CMV-A2L-1A*** | ***CMV-A3L-1A*** | ***CMV-B1L-1A*** | ***CMV-B2L-1A*** | ***CMV-B3L-1A*** | ***CMV-A1L-2A*** | ***CMV-A2L-2A*** | ***CMV-A3L-2A*** | ***CMV-B1L-2A*** | ***CMV-B2L-2A*** | ***CMV-B3L-2A*** |
| ***Price*** | | | | | | | | | | | | |
| ***Weight (lbs)*** | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| ***Valve Type*** | (2) 3-way 2-position N.C. single solenoids | (2) 3-way 2-position N.O. single solenoids | (2) 3-way 2-position N.O./N.C. single solenoids | 5-way 2-position single solenoid | 5-way 2-position double solenoid | 5-way 3-position double solenoid center closed | (2) 3-way 2-position N.C. single solenoids | (2) 3-way 2-position N.O. single solenoids | (2) 3-way 2-position N.O./N.C. single solenoids | 5-way 2-position single solenoid | 5-way 2-position double solenoid | 5-way 3-position double solenoid center closed |
| ***Acting*** | Internally Piloted | | | | | | | | | | | |
| ***Diagram*** | A | B | C | D | E | F | A | B | C | D | E | F |
| ***Port Size*** | Out=5/32" or 4mm | | | | | | Out=1/4" | | | | | |
| ***Orifice Size**** | Cv=0.2 | | | | | | Cv=0.5 | | | | | Cv=0.3 |
| ***Fluid*** | Air (to be filtered by 40µ filter element) | | | | | | | | | | | |
| ***Nom Pressure*** | Vacuum - 145 psi (vacuum - 10 bar) valve supply / 45-100 psi (3-7 bar) pilot supply | | | | | | | | | | | |
| ***Voltage ±10%*** | 24VDC | | | | | | | | | | | |
| ***Power Consumption*** | 0.9W (per solenoid) | | | | | | | | | | | |
| ***Max Frequency*** | 8 cycles/sec | | | | | | | | | | | |
| ***Insulation*** | F class (155°C / 311°F max coil only) | | | | | | | | | | | |
| ***Min Response*** | 8ms | | | | 20ms | | 8ms | | | | 20ms | |
| ***Temperature*** | -10-60°C [14-140°F] | | | | | | | | | | | |
| ***Lubrication*** | Filtered air without lubrication; lubrication, if used, must be continuous | | | | | | | | | | | |
| ***Protection*** | IP65 (when using NITRA cables) | | | | | | | | | | | |
| ***Body*** | Aluminum with technolopolymer (Celcon) shell | | | | | | | | | | | |
| ***Agency Approvals*** | None | | | | | | | | | | | |

**** Cv test conditions of 90psi inlet, ΔP = 14.5 psi, temperature 70°F (21.1°C)***

# Compact Modular Valves

| Compact Modular Valve Specifications | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Models** | CMV-A1L-3A | CMV-A2L-3A | CMV-A3L-3A | CMV-B1L-3A | CMV-B2L-3A | CMV-B3L-3A | CMV-A1L-3B | CMV-A2L-3B | CMV-A3L-3B |
| **Price** | | | | | | | | | |
| **Weight (lbs)** | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.3 | 0.3 |
| **Valve Type** | (2) 3-way 2-position N.C. single solenoids | (2) 3-way 2-position N.O. single solenoids | (2) 3-way 2-position N.O./N.C. single solenoids | 5-way 2-position single solenoid | 5-way 2-position double solenoid | 5-way 3-position double solenoid center closed | (2) 3-way 2-position N.C. single solenoids | (2) 3-way 2-position N.O. single solenoids | (2) 3-way 2-position N.O./N.C. single solenoids |
| **Acting** | Internally Piloted | | | | | | | | |
| **Diagram** | A | B | C | D | E | F | A | B | C |
| **Port Size** | Out=5/16" or 8mm | | | | | | | | |
| **Orifice Size*** | Cv=0.65 | | | | | Cv=0.3 | Cv=1.0 | | |
| **Fluid** | Air (to be filtered by 40µ filter element) | | | | | | | | |
| **Nom Pressure** | Vacuum - 145 psi (vacuum - 10 bar) valve supply / 45-100 psi (3-7 bar) pilot supply | | | | | | | | |
| **Voltage ±10%** | 24VDC | | | | | | | | |
| **Power Consumption** | 0.9W (per solenoid) | | | | | | | | |
| **Max Frequency** | 8 cycles/sec | | | | | | | | |
| **Insulation** | F class (155°C / 311°F max coil only) | | | | | | | | |
| **Min Response** | 8ms | | | | 20ms | | 8ms | | |
| **Temperature** | -10-60°C [14-140°F] | | | | | | | | |
| **Lubrication** | Filtered air without lubrication; lubrication, if used, must be continuous | | | | | | | | |
| **Protection** | IP65 (when using NITRA cables) | | | | | | | | |
| **Body** | Aluminum with technolopolymer (Celcon) shell | | | | | | | | |
| **Agency Approvals** | None | | | | | | | | |

| Compact Modular Valve Specifications | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Models** | CMV-B1L-3B | CMV-B2L-3B | CMV-B3L-3B | CMV-A1L-4A | CMV-A2L-4A | CMV-A3L-4A | CMV-B1L-4A | CMV-B2L-4A | CMV-B3L-4A |
| **Price** | | | | | | | | | |
| **Weight (lbs)** | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| **Valve Type** | 5-way 2-position single solenoid | 5-way 2-position double solenoid | 5-way 3-position double solenoid center closed | (2) 3-way 2-position N.C. single solenoids | (2) 3-way 2-position N.O. single solenoids | (2) 3-way 2-position N.O./N.C. single solenoids | 5-way 2-position single solenoid | 5-way 2-position double solenoid | 5-way 3-position double solenoid center closed |
| **Acting** | Internally Piloted | | | | | | | | |
| **Diagram** | D | E | F | A | B | C | D | E | F |
| **Port Size** | Out=5/16" or 8mm | | | Out=3/8" | | | | | |
| **Orifice Size*** | Cv=1.0 | | Cv=0.5 | Cv=1.2 | | | | | Cv=0.5 |
| **Fluid** | Air (to be filtered by 40µ filter element) | | | | | | | | |
| **Nom Pressure** | Vacuum - 145 psi (vacuum - 10 bar) valve supply / 45-100 psi (3-7 bar) pilot supply | | | | | | | | |
| **Voltage ±10%** | 24VDC | | | | | | | | |
| **Power Consumption** | 0.9W (per solenoid) | | | | | | | | |
| **Max Frequency** | 8 cycles/sec | | | | | | | | |
| **Insulation** | F class (155°C / 311°F max coil only) | | | | | | | | |
| **Min Response** | 8ms | 20ms | | 8ms | | | | 20ms | |
| **Temperature** | -10-60°C [14-140°F] | | | | | | | | |
| **Lubrication** | Filtered air without lubrication; lubrication, if used, must be continuous | | | | | | | | |
| **Protection** | IP65 (when using NITRA cables) | | | | | | | | |
| **Body** | Aluminum with technolopolymer (Celcon) shell | | | | | | | | |
| **Agency Approvals** | None | | | | | | | | |

** Cv test conditions of 90psi inlet, ΔP = 14.5 psi, temperature 70°F (21.1°C)*

# Compact Modular Valves

## Compact Modular Valves - Intermediate Modules

In applications with a large number of high flow valves, an intermediate through module (CMV-D1X-3X) provides additional air inlets. If dual pressures are desired in a manifold, an intermediate blind module (CMV-D2X-3X) provides an independent supply to valves to its right while blocking the main supply from the left. For applications requiring quicker exhaust on some valves, an intermediate exhaust module (CMV-D3X-3X) provides a dedicated exhaust for valves to its right while blocking exhaust from valves to its left.

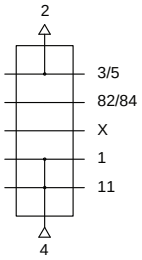



**Diagram "A"**

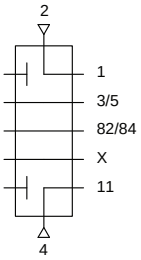



**Diagram "B"**

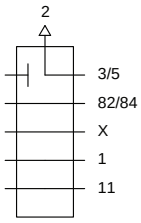
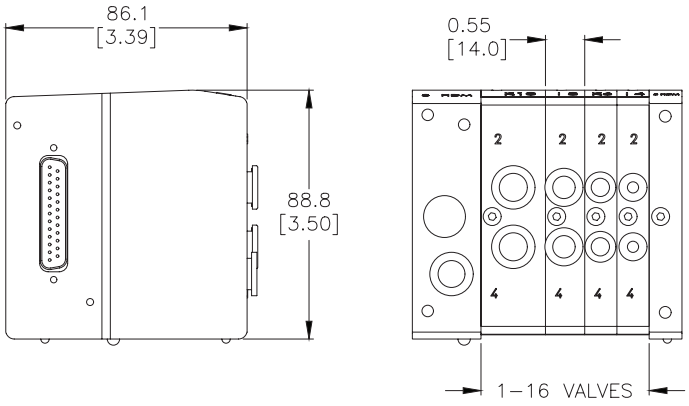



**Diagram "C"**

| Compact Modular Valve - Intermediate Modules | | | | | |
|---|---|---|---|---|---|
| ***Item*** | ***Part No.*** | ***Price*** | ***Description*** | ***Diagram*** | ***Weight (lbs)*** |
|  | ***CMV-D1X-3X*** | | NITRA pneumatic modular plate, intermediate, through, (2) 5/16 inch (8 mm) push-to-connect tubing inlet port(s), Cv=0.65, reinforced technopolymer body. For use with CMV series solenoid valves. | A | 0.3 |
|  | ***CMV-D2X-3X*** | | NITRA pneumatic modular plate, intermediate, blind, (2) 5/16 inch (8 mm) push-to-connect tubing inlet port(s), Cv=0.65, reinforced technopolymer body. For use with CMV series solenoid valves. | B | 0.3 |
|  | ***CMV-D3X-3X*** | | NITRA pneumatic modular plate, intermediate, exhaust, 5/16 inch (8 mm) push-to-connect tubing exhaust port, Cv=0.65, reinforced technopolymer body. For use with CMV series solenoid valves. | C | 0.3 |

## Dimensions

**mm [inches]**




***See our website for complete Engineering drawings.***

# Compact Modular Valves

| Compact Modular Valve Accessories | | | | |
|---|---|---|---|---|
| ***Item*** | ***Part No.*** | ***Price*** | ***Description*** | ***Weight (lbs)*** |
|  | ***CMV-SW-CD*** | | NITRA configuration software, CD. For use with CMV series EtherNet/IP modules.<br>OS compatibility:<br>Windows XP, 32 bit<br>Windows 7, 64 bit<br>Windows 8, 32 & 64 bit<br>Win 8.1, 32 & 64 bit<br>Win 10, 64 bit | 0.1 |
|  | ***CMV-SW-USB*** | | NITRA configuration software, USB. For use with CMV series EtherNet/IP modules.<br>OS compatibility:<br>Windows XP, 32 bit<br>Windows 7, 64 bit<br>Windows 8, 32 & 64 bit<br>Win 8.1, 32 & 64 bit<br>Win 10, 64 bit | 0.1 |
|  | ***CMV-ACC01*** | | NITRA pigtail cable, 25-pin D-sub female connector, IP65, 45 degree cable entry, 28AWG, 1 meter (3.3 ft.) length | 0.4 |
|  | ***CMV-ACC02*** | | NITRA pigtail cable, 25-pin D-sub female connector, IP65, 45 degree cable entry, 28AWG, 2.5 meter (8.2 ft.) length | 0.9 |
|  | ***CMV-ACC03*** | | NITRA pigtail cable, 25-pin D-sub female connector, IP65, 45 degree cable entry, 28AWG, 5 meter (16.4 ft.) length | 1.6 |
|  | ***CMV-ACC04*** | | NITRA pneumatic mounting bracket, attaches CMV series valve assemblies to 35mm DIN rail. Includes mounting screws. | 0.1 |
|  | ***CMV-ACC06*** | | NITRA pneumatic release tool, for push-to-connect fittings, tube diameters 1/8 inch through 3/8 inch | 0.1 |
|  | ***CMV-ACC07*** | | NITRA pneumatic release tool, for push-to-connect fittings, tube diameters 5/32 inch through 1/2 inch | 0.1 |
|  | ***CMV-ACC08*** | | NITRA pneumatic screw set, replacement, for CMV series solenoid valves. Includes (1) M4-0.7x5 cone point screw and (1) M4-0.7x34 cone point screw. | 0.1 |
|  | ***CMV-ACC09*** | | NITRA pneumatic gasket, replacement, for CMV series solenoid valves. 5 per package. | 0.1 |

# Compact Modular Valves - Accessories

| Compact Modular Valve Accessories | | | | |
|---|---|---|---|---|
| ***Item*** | ***Part No.*** | ***Price*** | ***Description*** | ***Weight (lbs)*** |
|  | ***CMV-ACC10*** | | NITRA pneumatic molded O-ring, replacement, for CMV series solenoid valves. 5 per package. | 0.1 |
|  | ***CMV-ACC11*** | | NITRA connector, 25-pin female D-sub, 45-degree cable entry, accepts 0.19 to 0.39 inch diameter cable, accepts wire size 22 - 18 AWG, solder connections, IP65. For use with CMV series solenoid valves. | 0.2 |
|  | ***CMV-ACC12*** | | NITRA blank marking tag, replacement. Package of 10. For use with CMV cable connectors. | 0.1 |