

**NEW**

# PRODUCT DATA SHEET INFORMATION

## M DM2® Series C



### Modular Double Valve with Integrated Soft Start Control Reliable Energy Isolation Port Size 3/4

**FEATURES:**

- Proven ROSS DM2® technology with integrated soft start
- Soft start application of air to the system when energized; can be adjusted for slower or faster buildup of system pressure
- Rapid exhaust of downstream air when de-energized to remove stored energy and allow safe access
- Modular mounting for flexible configured air entry system assembly; order a single part number to meet your specific application requirements
- **Dynamic Monitoring With Memory:** Memory, monitoring, and air flow control functions are integrated into two identical valve elements. Valves lock-out if asynchronous movement of valve elements occurs during actuation or de-actuation, resulting in a residual outlet pressure of less than 1% of supply.
- **An action is required for reset:** Cannot be reset by removing and re-applying supply pressure. Reset can be accomplished by the integrated electrical (solenoid) reset or by the manual reset button.
- **Basic 3/2 Normally Closed Valve Function:** Dirt tolerant, wear compensating poppet design for quick response and high flow capacity. PTFE back-up rings on pistons to enhance valve endurance – operates with or without inline lubrication.
- **LED Indication:** Light-emitting diode (LED) indicators of main solenoid operation, reset solenoid operation, and status indicator condition.
- **Status Indicator:** Includes a pressure switch with both normally open (NO) and normally closed (NC) contacts to provide status feedback to the control system indicating whether the valve is in the lockout or ready-to-run condition.
- **Transducer (optional):** For monitoring of downstream pressure in the system.
- **Silencers:** All models include high flow, clog resistant silencers.

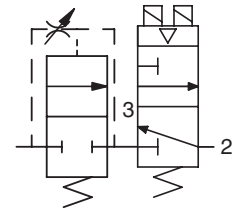


**Category 4**  
**Performance Level e**  
(certification pending)

U.S. Patent  
No. 6840258, 6840259  
(Worldwide Patents Pending)

Model Number*	Valve Size	Transducer	Port Size		C <sub>v</sub>		Weight lb (Kg)
			Inlet	Outlet	1 to 2	2 to 3	
MDM2CNA55A21	8	Without	3/4	3/4	3.7	8.5	16.1 (7.3)
MDM2CNA55A23	8	With	3/4	3/4	3.7	8.5	16.3 (7.4)

Simplified  
Schematic



\* NPT port threads. For BSPP threads, replace "N" in the model number with a "D", e.g., MDM2CDA55A21.

**Mounting brackets are required to install valve in the system, please see accessories, page 3 for ordering information.**

### Standard Specifications

**Pilot Solenoids:** According to VDE 0580. Enclosure rating according to DIN 400 50 IP 65. Connector socket according to DIN 43650 Form A. Three solenoids, rated for continuous duty.

**Standard Voltages:** 24 volts DC.

**Power Consumption (each solenoid):**

*For primary and reset solenoids:* 1.2 watts on DC.

**Enclosure Rating:** IP65, IEC 60529.

**Electrical connection:** M12, 5 Pin.

**Ambient Temperature:** 15° to 122°F (-10° to 50°C).

**Media Temperature:** 40° to 175°F (4° to 80°C).

**Flow Media:** Filtered, lubricated or unlubricated (mineral oils according to DIN 51519, viscosity classes 32-46); 5-micron recommended.

**Inlet Pressure:** 30 to 150 psig (2 to 10 bar).

**Pressure Switch (Status Indicator) Rating:** 5 amps at 30 volts DC.

**Monitoring:** Dynamically, cyclically, internally during each actuating and de-actuating movement. Monitoring function has memory and requires an overt act to reset unit after lockout.

**Mounting orientation:** Vertically with pilot solenoids on top.

**Port Threads:** NPT, BSPP.

*Product data for Sistema Library users, pending.*

**APPLICATIONS:** Category 4 applications - e.g., Air Dump/Release.

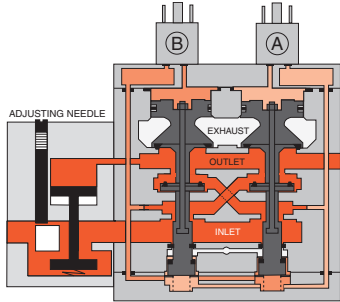


# Modular Double Valve with Integrated Soft Start

# Operation Overview

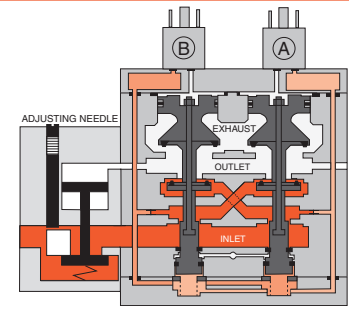
## Valve de-actuated (ready-to-run):

The flow of inlet air pressure to the inlet chamber of the main valve internals is restricted by a fixed orifice and an adjustable flow control as well as an air piloted 2-way normally closed poppet valve. The flow of inlet air pressure into the crossover passages is restricted by the size of the passage between the stem and the valve body opening. Flow is sufficient to quickly pressurize pilot supply/timing chambers A and B. The inlet poppets prevent air flow from crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the closed position. (Reset adapter omitted for clarity.)



## Valve actuated:

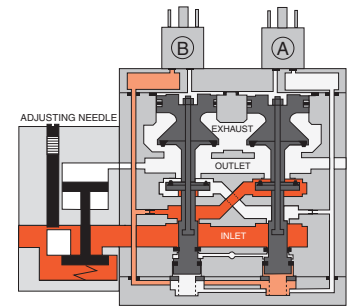
Engerizing the pilot valves simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated (open) position, where inlet air flow to crossover passages is fully open, inlet poppets are fully open and exhaust poppets are fully closed. The outlet is then pressurized at a rate allowed by the fixed orifice and the adjusted flow control. Once the air pressure in the outlet chamber reaches approximately 60% of inlet pressure, the air piloted 2-way normally closed poppet valve opens fully and the pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. The adjustable flow control will control the time it takes for the outlet air pressure to reach approximately 60% of inlet pressure. Green "SOL. 1" and SOL. 2" LEDs will be displayed when the main solenoids are energized. De-energizing the pilots quickly causes the valve elements to return to the ready-to-run position.



## Valve locked-out:

Whenever the valve elements operate in a sufficiently asynchronous manner, either on actuation or de-actuation, the valve will move to a locked-out position. In the locked-out position, one crossover and its related timing chamber will be exhausted, and the other crossover and its related timing chamber will be fully pressurized. The valve element (side B) that is partially actuated has pilot air available to fully actuate it, but no air pressure on the return piston to fully de-actuate the valve element.

Air pressure in the crossover acts on the differential of side B stem diameters creating a latching force. Side A is in a fully closed position, and has no pilot air available to actuate, but has full pressure on the inlet poppet and return piston to hold the element in the fully closed position. Inlet air flow on side A into its crossover is restricted, and flows through the open inlet poppet on side B, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure. The return springs are limited in travel, and can only return the valve elements to the intermediate (locked-out) position. Sufficient air pressure acting on the return pistons is needed to return the valve elements to a fully closed position.

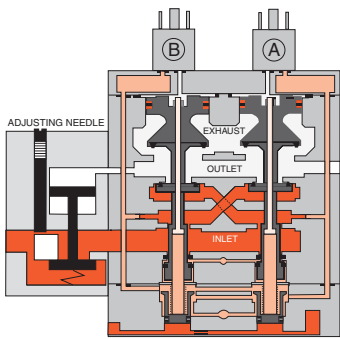


## Resetting the valve:

The valve will remain in the locked-out position, even if the inlet air supply is removed and re-applied. A remote reset signal must be applied to reset the valve. A momentary, remote electrical signal must be applied to the reset solenoid to apply pressure to the reset pistons in the valve. Actuation of the reset piston physically pushes the main valve elements to their closed position. Inlet air fully pressurizes the crossovers and holds the inlet poppets on seat. Actuation of the reset piston opens the reset poppet, thereby, immediately exhausting pilot supply air, thus, preventing valve operation during reset (Reset adapter added to illustration.). De-actuation of reset pistons causes the reset poppets to close and pilot supply to fully pressurize. Reset air pressure is applied by a 3/2 normally closed solenoid, or a manual push button mounted on the reset adapter in the top valve cover. A green "RESET SOL." LED will be displayed when the reset solenoid is energized.

### The reset procedure is as follows:

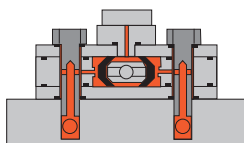
- Remove the electrical signals to the main coils
- Ensure there is air supplied to the valve
- Energize the reset solenoid for a minimum of 200 ms
- Allow a 200 ms delay after de-energizing the reset solenoid and re-energizing the main solenoids



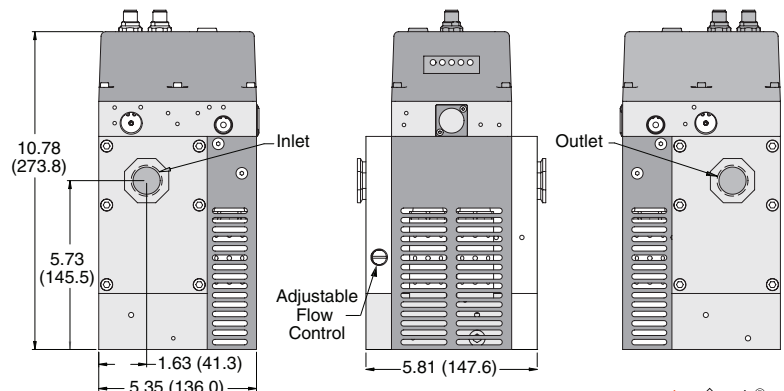
## Status indicator:

The status indicator pressure switch will actuate when the main valve is operating normally, and will de-actuate when the main valve is in the locked-out position or inlet pressure is removed. This device is not part of the valve lockout function, but, rather, only reports the status of the main valve. If the valve is in a ready-to-run condition, a green "STATUS" LED will be displayed. If the valve is faulted or there is no air pressure at the inlet, a red "STATUS" LED will be displayed.

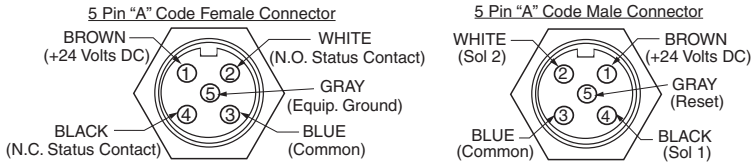
Status indicator  
in normal  
ready-to-run position



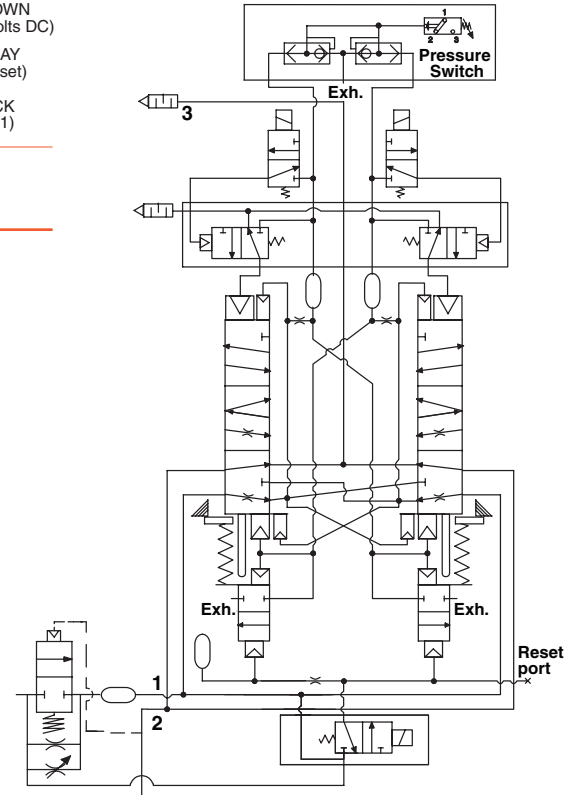
## SIZE DIMENSIONS – inches (mm)



## Valve Wiring



## M DM2® Series C Valve Schematic

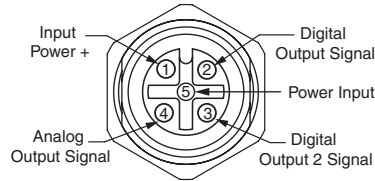


# Digital Pressure Transducer

Precision digital pressure transducer with 5 pin female connection

- Two PNP digital outputs which may be set individually, 4-20 mA analog output
- Three operation modes: Easy, Window and Hysteresis
- Selectable response times to eliminate output chattering
- Powered by 12-24 volts DC
- 6 pressure unit conversions
- Lockable keypad
- Fast zero reset

**Model Number 2447H77**



## Wiring Kits

**Kit Number 2431H77** M DM2C Wiring Kit - 5 meters (16.4 feet). Includes two cords, and the cord grips.

**Kit Number 2432H77** M DM2C Wiring Kit with Transducer - 5 meters (16.4 feet). Includes three cords, and the cord grips.

# Mounting Accessories

*At least two mounting brackets should be used.*

*This can consist of two clamp mounting brackets or one clamp mounting bracket and one mounting bracket kit 2433H77.*

## Clamp for Module Connections

Specially designed clamps provide a quick and easy assembly or disassembly of the modules. Two Allen-head bolts quickly tighten or loosen the clamp using a 5/32 or 4mm hex key. The clamp contains a plate carrying two O-rings to provide positive sealing between modules.

Order clamp by part number **R-A118-105**.

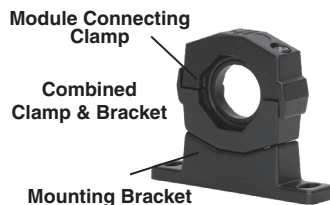
Combined clamp and bracket can be ordered by part number **R-A118-105M**.

## Mounting Brackets

Two brackets are normally used to mount an FRL to a vertical surface. The mounting bracket attaches to the module connecting clamp with a single screw. Each bracket then employs two bolts (1/4" or 6mm) to connect the assembly to the mounting surface.

Order bracket and screw by part number **R-A118-103**.

Combined bracket and clamp can be ordered by part number **R-A118-105M**.



## Male and Female End Ports

Either male or female end ports can be attached to threaded inlet and outlet lines. This allows all modules of an FRL assembly to be removed easily and quickly without having to unthread the end modules. The end ports are attached to the modules with clamps (see at left). End ports can be included in an assembled FRL or ordered separately by the following part numbers:

Port Size	Male Part Number*	Female Part Number*
1/4 NPTF	R-118-109-2F	R-118-100-2
3/8 NPTF	R-118-109-3F	R-118-100-3
1/2 NPTF	R-118-109-4F	R-118-100-4
3/4 NPTF	R-118-109-6F	R-118-100-6

\*For BSPP threads, add a "W" suffix to the model number, e.g., R-118-109-2FW.

## Extra Port Blocks

An extra port block can be placed between modules to provide two auxiliary 1/4 NPTF ports. Its mounting position can be rotated to obtain the most convenient operating orientation. If only one auxiliary port is to be used, the unused port must be closed with a pipe plug. (The inlet and outlet are not threaded.)

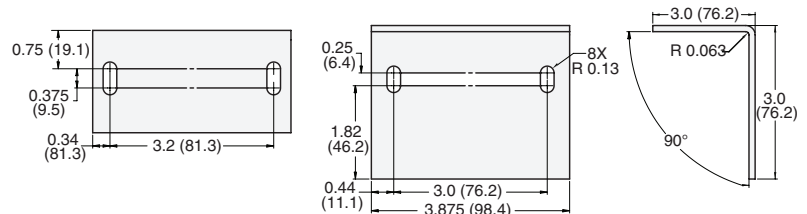
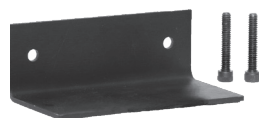
Port Size	Part Number*
1/4 NPTF	R-118-106-2
3/8 NPTF	R-118-106-3
1/2 NPTF	R-118-106-4

\*For BSPP threads, add a "W" suffix to the model number, e.g., R-118-109-2FW.

## Mounting Bracket Kit

**Part Number 2433H77**

Mounting Bracket Kit includes bracket and bolts to mount to the valve end plate.



# Air Entry Packages with Control Reliable Energy Isolation

## Category 4 with Manual L-O-X® and M DM2® Series C Double Valve with Integrated Soft Start

Pneumatic Energy Isolation (LOTO)



- Pre-engineered panel mountable design with air entry via a filter and regulator “FR”, or filter, regulator and lubricator “FRL”
- Includes M DM2® Series C Double Valve with Monitoring & Memory:
  - a) Self-contained dynamic monitoring system requires no further valve monitoring controls,
  - b) Dynamic memory of abnormal function prevents unintentional reset with removal of air or electricity
- All necessary features for safety applications are included:
  - a) Electrical reset valve,
  - b) Status indicator switch for valve condition (ready to run) feedback

*These systems are not designed for controlling clutch/brake mechanisms on mechanical power presses.*

### HOW TO ORDER

(Choose your options (in red) to configure your valve assembly model number.)

**M 5 1 1 X A 2 1 2 1 1**

PIPE SIZE	4	5	D	E
1/2 NPTF	4			
3/4 NPTF		5		
1/2 BSPP			D	
3/4 BSPP				E

LOCKOUT VALVE TYPE	1	2	X
Modular L-O-X®	1		
L-O-X®		2	
No L-O-X®			X

PIPE SIZE	1	2	X
5 Micron, Manual Drain, Metal Bowl	1		
5 Micron, Auto Drain, Metal Bowl		2	
None			X

LUBRICATOR FILL TYPE	2	X
Fill Port	2	
No lubricator		X

CABLE OPTIONS	1	X
Yes	1	
No		X

DOWNSTREAM PRESSURE SWITCH (includes 1/4" Extra Port)	1	X
586A86	1	
None		X

EXTRA PORTS (Downstream of M DM2®)	2	3	4	X
1/4	2			
3/8		3		
1/2			4	
None				X

EXTRA PORTS (Prior to MDM2® Exhaust Valve)	2	3	4	X
1/4	2			
3/8		3		
1/2			4	
None				X

M DM2® VALVE	1	3
Without Transducer	1	
With Transducer		3

*Custom panel options available, consult ROSS.*

### FLUID POWER PRODUCTS FOR PNEUMATIC SOLUTIONS:

- Base Mounted Valves and Sub-Bases
- Line Mounted Valves
- Manual & Mechanical Valves
- Flow Control Products
- Air Preparation Products (F-R-L's)
- Safety-Related Products
- ROSS/FLEX® Solution
- ROSS Integrated Systems



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**WARRANTY, CAUTIONS and WARNINGS**  
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