



# HAZARDOUS LOCATIONS SAFE EXHAUST DOUBLE VALVES DM<sup>2</sup>® SERIES C

## PRODUCT CATALOG



# Safe Exhaust Explosion-Proof Double Valves DM<sup>2</sup>® Series C

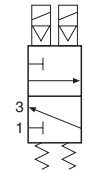
## Product Overview



### Safe Exhaust Safety Function

The DM<sup>2</sup> Series C valve safety function is to shut off supply or pneumatic energy and to exhaust any pneumatic energy from downstream of the valve. Valves are equipped with explosion proof coils and feedback sensors for use in hazardous locations to prevent potentially explosive situations.

### Simplified Schematic



The DM<sup>2</sup> Series C Safe Exhaust valves are dual valves used to block the supply and remove the downstream pressure from the circuit or machine. It is integrated into the electrical safety system to remove potentially hazardous energy in order to provide employees safe access to a machine or zone. By quickly removing the pneumatic energy with a safety valve, determined by the risk assessment, the safety system integrity is maintained allowing the employee to complete their tasks safely and rapidly.

Applicable Requirements	C22.2 No. 0-10 - General Requirements - Canadian Electrical Code, Part II; CSA C22.2 No. 25-1966 - Enclosures for use in Class II Groups E, F and G Hazardous Locations; CSA C22.2 No. 142-M1987 - Process Control Equipment; C22.2 No. 213-M1987 - Nonincendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations; CAN/CSA E79-0-95 - Electrical apparatus for explosive atmospheres, Part 0: General requirements; CAN/CSA E79-18-95 - Electrical apparatus for explosive atmospheres, Part 18: Encapsulation "m".
APPROVED for use in the following Hazardous Locations	Ex m II T4 and Division 1 – Specifications in accordance to CSA certificate: Class I, Division 1, Groups A, B, C and D; Class II, Groups E, F and G; Class III; Class I, Division 2, Groups A, B, C, D
Specifications in accordance to FM certificate	Explosion-proof Class I, Division 1, Groups A, B, C, D, T4, Ta = 60 °C (encapsulation/explosion-proof Class I, Zone 1, AEx m II T4, Ta = 60 °C; dust-ignition-proof for Class II/III, Division 1, Groups E, F and G, T4, Ta = 60 °C); Nonincendive Class I, Division 2, Groups A, B, C, D, T4, Ta = 60 °C; Suitable for Class II, III, Division 2, Groups E, F, G, T4, Ta = 60 °C CSA CLASS 2258 02 – process control equipment – for hazardous locations FM CLASS 3600, 3611, 3615, 3810 – hazardous (classified) location electrical equipment

## VALVE FEATURES

Dynamic Monitoring	Monitoring, and air flow control functions are simply integrated into two identical valve elements
Dynamic Memory	Asynchronous movement of valve elements is detected by the dynamic monitoring and the valve latches in the safe condition, resulting in a residual outlet pressure of less than 1% of supply
Valve Reset	Reset can only be accomplished by the integrated electrical (solenoid) reset; the valve cannot be reset by removing and re-applying supply pressure
Poppet Design	Dirt tolerant, wear compensating for quick response and high flow capacity
PTFE Backup Piston Rings	Enhances valve endurance enabling operation with or without inline lubrication
Explosion-proof Coils	Contain any spark originating from within the coil or housing preventing the ignition of any flammable material in the surrounding environment, resulting in a larger explosion
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
Silencer	Includes high flow, clog resistant silencer
Mounting	Base mounted for ease of valve replacement. Captive valve-to-base mounting screws Inlet and outlet ports on both sides provide for flexible piping (plugs for unused ports included)
Intermediate Pilots (Basic Size 12 and 30 valves only)	Increases pilot air flow for fast valve response, making it possible to use the same size solenoids as valve sizes 2, 4 & 8, thereby reducing electrical power requirements for these larger valves
SISTEMA Library	Available for download at <a href="http://rosscontrols.com">rosscontrols.com</a>

*These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM<sup>2</sup> Series D double valves for mechanical power press applications.*

## STANDARD SPECIFICATIONS

<b>GENERAL</b>	Function		Safe Exhaust; Explosion-Proof
	Construction Design		3/2 Valve; Dual Poppet
	Actuation		Electrical
	Mounting	Type	Base
		Orientation	Vertically with pilot solenoids on top
	Connection		Threaded; G, NPT
	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
Minimum Operation Frequency		Once per month, to ensure proper function	
<b>OPERATING CONDITIONS</b>	Temperature	Ambient	15° to 122°F (-10° to 50°C)
		Media	40° to 175°F (4° to 80°C)
	Flow Media		Filtered, lubricated or unlubricated (mineral oils according to DIN 51519, viscosity classes 32-46)
	Operating Pressure		30 to 120 psig (2.1 to 8.3 bar)
<b>ELECTRICAL DATA</b>	Solenoids		According to VDE 0580. Enclosure rating according to DIN 400 50 IP 65 Three solenoids, rated for continuous duty
	Operating Voltage		24 volts DC 120 volts AC, 60 Hz
	Power Consumption (each solenoid)	Primary & Reset Solenoids	24 V DC – 4.6 watts 120 V AC – 6.8 volt amps
	Enclosure Rating		IP65, IEC 60529
	Electrical Connection		Three lead wires with 1/2" NPT conduit connection
	Mechanical Pressure Switch (Status Indicator) Rating		Contacts - 1 amps at 250 volts AC, SPDT Pressure Switch Enclosure: IP66
<b>CONSTRUCTION MATERIAL</b>	Valve Body		Cast Aluminum
	Poppet		Acetal and Stainless Steel
	Seals		Buna-N
<b>SAFETY DATA</b>	Functional Safety Data	Category	CAT 4, PL e
		B <sub>10D</sub>	20,000,000
		PFH <sub>D</sub>	7.71x10 <sup>-9</sup>
		MTTF <sub>D</sub>	301.9 (n <sub>op</sub> : 662400)
	Vibration/Impact Resistance		Tested to DIN EN 60068-2-6

**IMPORTANT NOTE:** Please read carefully and thoroughly all of the CAUTIONS, WARNINGS on the inside back cover.

## PRODUCT CREDENTIALS

Safety Category	ATEX Certified	Factory Mutual Certification	DGUV (German Social Accident Insurance)	CE Conformity Declaration	EAC Conformity Declaration	ISO Standard	CSA Certificate of Compliance	CRN Certification
						ISO 13849-1:2015		Available for appropriately tested valves



**บริษัท ฟลูเทค จำกัด**  
**FLU-TECH CO.,LTD**

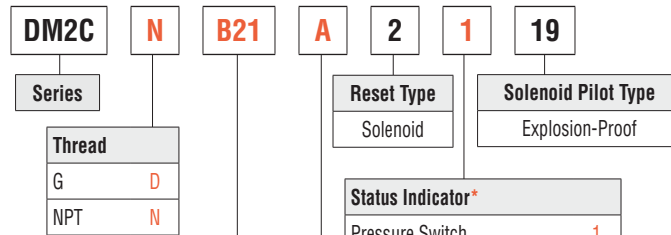
845/3-4 หมู่ 3 ถ.เทพารักษ์ ต.เทพารักษ์ อ.เมือง จ.สมุทรปราการ 10270

845/3-4 Thepharak RD., T.Thepharak, A.Muang, Samutprakarn 10270 THAILAND  
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# Ordering Information

## MODEL NUMBER CONFIGURATOR

## 3-Way 2-Position Valves



Basic Size	Port Size			
	In	Out	Exhaust	
2	1/4	1/4	3/4	B20
	3/8	3/8	3/4	B21
	Valve Only (No Base)			B2X
4	1/2	1/2	1	A42
	Valve Only (No Base)			A4X
8	3/4	3/4	1	A54
	1	1	1	A55
	Valve Only (No Base)			A5X
12	1	1	1-1/2	A66
	Valve Only (No Base)			A6X
30	1-1/2	2	2-1/2	A88
	Valve Only (No Base)			A8X

Status Indicator*	
Pressure Switch	1
None/Valve Only (N/A)	X

\*Installed in the base.

Voltage*	
24 volts DC	A
120 volts AC, 60 Hz	B

\*For other voltages consult ROSS.

*For ATEX certified valves order placement, consult ROSS.*

Basic Size	Port Size			Flow Cv		Weight # lb (kg)
	1	2	3	1-2	2-3	
2	1/4	1/4	3/4	1.7	2.6	5.3 (2.4)
	3/8	3/8	3/4	2.2	3.6	
4	1/2	1/2	1	3.0	6.5	5.9 (2.6)
8	3/4	3/4	1	4.2	9.4	8.4 (3.7)
	1	1	1	4.3	9.4	
12	1	1	1-1/2	9	17	15.3 (3.7)
30	1-1/2	2	2-1/2	20	55	34.7 (15.1)

# Valve and base assembly with status indicator.



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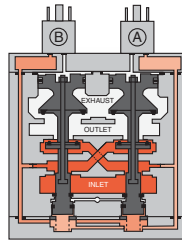
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# Valve Operation



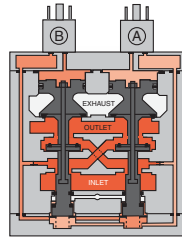
## Valve De-actuated (ready-to-run)

The flow of inlet air pressure into the crossover passages from the inlet chamber is restricted by orifices that allow air pressure to bypass the lower inlet poppets. Flow is sufficient to quickly pressurize the pilot supply/timing chambers on both sides A and B. The upper inlet poppets prevent air flow from the crossover passages into the outlet chamber. Air pressure acting on the inlet poppets and return pistons securely hold the valve elements in the de-actuated position. (Internal air passages shown out of the valve body for clarity.)

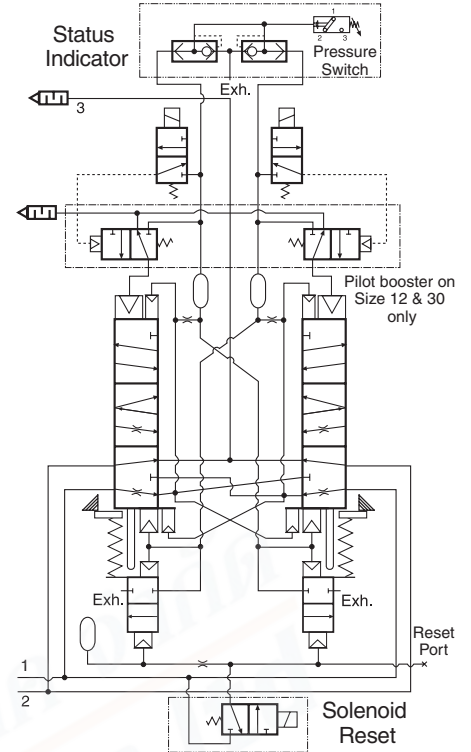


## Valve Actuated

Energizing the pilot solenoids simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated position, where inlet air flow to outlet is open and both exhaust poppets are closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. De-energizing the main solenoids causes the valve elements to return to the ready-to-run (de-actuated) position.



Valve Schematic



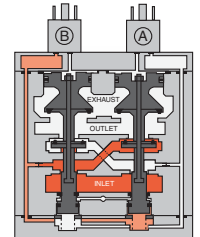
## Asynchronous Operation

If the valve elements operate in a sufficiently asynchronous manner on ACTUATION, the valve will shift into a position where one crossover and its related timing chambers will be exhausted, and the other crossover and its related timing chambers will be pressurized.

In the illustration, side B is in the de-actuated position, but has no pilot air available to actuate with and has full pressure on its upper and lower inlet poppets and return piston to hold it in place.

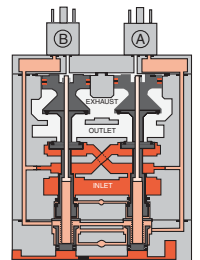
Inlet air flow on side B into its crossover is restricted and flows through the open upper inlet poppet on side A, through the outlet into the exhaust port, and from the exhaust port to atmosphere. Residual pressure in the outlet is less than 1% of inlet pressure.

Once the main solenoids are de-energized, actuating pressure is removed from the top of the main pistons and then the lower inlet poppet return spring along with inlet air pressure acting on the side A return piston will push side A back into the de-actuated position. Inlet air pressurizes the crossovers and volume chambers. Pressure in the crossovers helps hold the upper inlet poppets on seat. The valve will then be in the ready-to-run position. On the next attempt to actuate normally, if side B is still unable to actuate synchronously with side A, the same sequence of events described above will occur again.



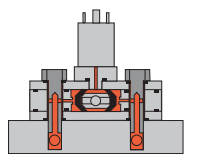
## WARNING

If asynchronous operation occurs while DE-ACTUATING, the pilot supply/timing chambers on one side will still be exhausted as described above. However, this could be a temporary situation because the cause of the asynchronous operation may be able to correct itself allowing the stuck or slow acting side of the valve to eventually move back into the de-actuated position. Once the slow or stuck side has de-actuated, the pilot supply/timing chambers that were exhausted will then repressurize. If an external monitoring system is only checking the status indicator periodically this fault signal could be missed. The machine's safety system must be designed to ensure that this does not cause a hazardous situation.



## 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.



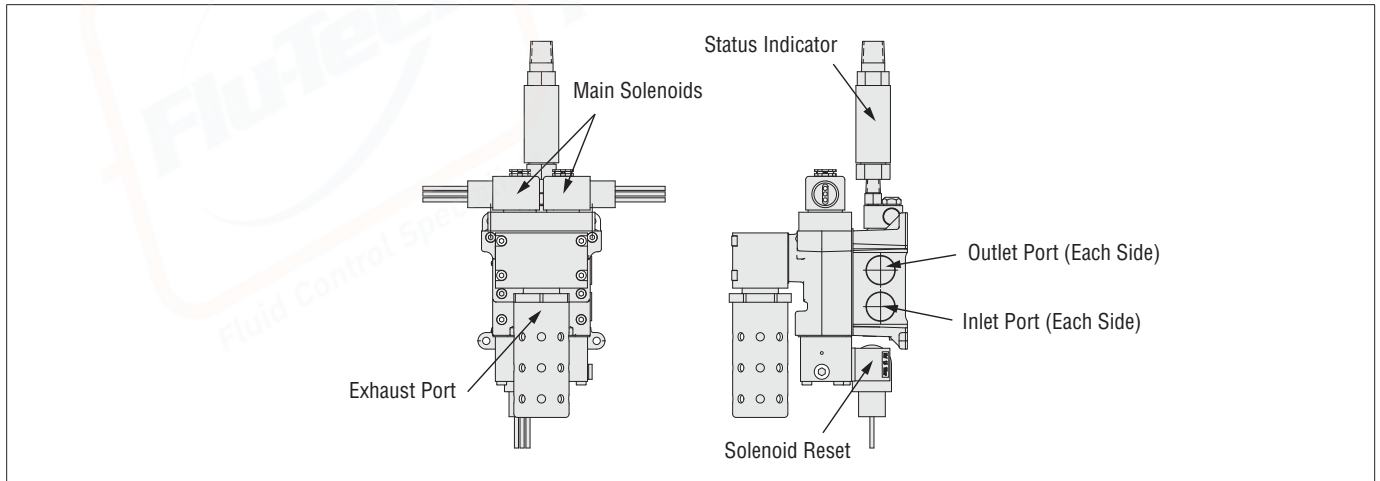
Status Indicator in normal ready-to-run position

# Valve Technical Data

DIMENSIONS		Inches (mm)	
Basic Size	Port Size	View X (base mounting hole pattern)	
2	1/4 3/8		
4	1/2		
8	3/4 1		
<p>For additional information, and to assist you with piping and connectivity designs, our products are available in downloadable 2D drawings and 3D CAD models in a wide range of options including native formats, visit <a href="http://www.rosscontrols.com">www.rosscontrols.com</a>.</p>			



DIMENSIONS		Inches (mm)
Basic Size	Port Size	View X (base mounting hole pattern)
12	1	
<p>For additional information, and to assist you with piping and connectivity designs, our products are available in downloadable 2D drawings and 3D CAD models in a wide range of options including native formats, visit <a href="http://www.rosscontrols.com">www.rosscontrols.com</a>.</p>		



## Accessories & Options

### SILENCERS

High Flow Noise Reduction Silencer Kits	Basic Size	Kit Number*		Flow scfm (L/s)	Combined Valve and Silencer Dimensions inches (mm)			Pressure Range psig (bar)	
		Thread			Width	Height			Depth
		R/Rp	NPT			R/Rp	NPT Thread		
2	2329H77	2324H77	800 (378)	4.34 (110.2)	21.40 (543.6)	19.06 (484.1)	7.27 (184.7)	0-125 (0-8.6) maximum	
4									
8	2330H77	2325H77	800 (378)	5.41 (137.4)	23.52 (597.4)	21.18 (538.0)	8.41 (213.6)		
12	2331H77	2326H77	2080 (982)	6.74 (117.2)	28.20 (716.3)	25.85 (656.6)	10.66 (270.8)		
30	2332H77	2327H77	7200 (3398)	9.85 (250.2)	41.55 (1055.4)	41.55 (1055.4)	13.47 (342.1)		
* Kits include all plumbing required for installation.									
Reduces the Exponentially Perceived Noise (EPNdB), Impact noise reduction in the 35–40 dB range.									

### STATUS INDICATOR

Status Indicator Assembly	Status Indicator Type	Model Number
	The Status Indicator pressure switch actuates when the valve is in a ready-to-run condition and de-actuates when the valve is in a lockout condition or when the inlet air pressure has been removed. Although, the valves can be purchased with this option already installed, the Status Indicator can be purchased separately.	Y739B94

