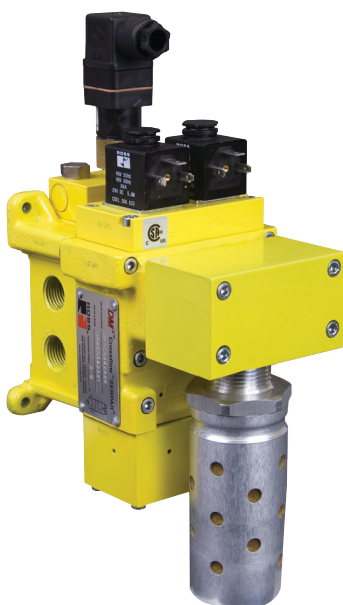




SAFE EXHAUST DM²® SERIES C VALVES



PRODUCT CATALOG

Safe Exhaust Control Reliable Double Valves DM^{2®} Series C

Product Overview

Safe Exhaust Safety Function

The DM^{2®} Series C valve safety function is to shut off supply or pneumatic energy and to exhaust any pneumatic energy from downstream of the valve.

Size 2	Basic Size 4 & 8	Basic Size 12 & 30
		

Illustration examples.

The DM^{2®} 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 and safely and rapidly.

VALVE FEATURES

Redundant Control	Redundant control can achieve Category 4, PL e, when used with proper safety controls
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	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 in-line lubrication
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	High flow, clog resistant silencer included
Mounting	Base mounted for ease of valve replacement, captive valve-to-base mounting screws
Flexible Piping	Inlet and outlet ports on both sides (plugs for unused ports included)
Intermediate Pilots (Basic Size 12 & 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

These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM^{2®} Series D double valves for mechanical power press applications.

PRODUCT CREDENTIALS

Performance Level Per ISO 13849-1:2015 	Safety Integrity Level Per IEC 2061:2001 	DGUV 	Declaration of Conformity  	Certificate of Compliance 
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STANDARD SPECIFICATIONS						
GENERAL	Function		3/2 Valve		Normally Closed	
	Construction Design		Dual Poppet			
	Actuation		Electrical		Solenoid Pilot Controlled	
	Mounting	Type	Base			
		Orientation	Vertically with pilot solenoids on top			
	Connection		Threaded Port		NPT G	
	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				
OPERATING CONDITIONS	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		Valve Basic Size		2	45 to 150 psig (3.1 to 10.3 bar)
					4, 8, 12, 30	30 to 120 psig (2.1 to 8.3 bar)
	Pilot Supply Pressure		Must meet minimum operating pressure			
ELECTRICAL DATA	Solenoids		Current Flow	Operating Voltage	Valve Basic Size	Power Consumption (each solenoid)
	Primary Solenoids		DC	24 volts	2, 4, 12, 30	5.8 watts nominal, 6.5 watts maximum
					8	15 watts
			AC	110 volts, 50 Hz; 120 volts, 50/60 Hz	2, 4, 12, 30	5.8 watts nominal, 6.5 watts maximum
					8	36 VA inrush and 24.6 VA holding
					2, 4, 12, 30	5.8 watts nominal, 6.5 watts maximum
				8	32 VA inrush and 22 VA holding	
	Rated for continuous duty					
	Design according to VDE 0580					
	Reset Solenoids		Current Flow	Operating Voltage	Valve Basic Size	Power Consumption (each solenoid)
			DC	24 volts	2, 4, 8, 12, 30	5.8 watts nominal, 6.5 watts maximum
			AC	110 volts, 50 Hz; 120 volts, 50/60 Hz		
			Rated for continuous duty			
	Design according to VDE 0580					
	Enclosure Rating		DIN 40050, IP65, IEC 60529			
	Electrical Connection		DIN EN 175301-803		Form A	
M12						
Mechanical Pressure Switch (Status Indicator) Rating		NO/NC Contacts		0.1 A, 125/250 volts AC; 0.1 A, 30 volts DC; 0.3 A, 60 volts DC		
Solid State Pressure Sensor (Status Indicator) Rating		Supply Voltage		8-30 volts DC		
		Current Consumption		<4mA		
CONSTRUCTION MATERIAL	Valve Body		Cast Aluminum			
	Poppet		Acetal and Stainless Steel			
	Seals		Buna-N			
SAFETY DATA	Functional Safety Data		Category		CAT 4, PL e	
			B _{10D}		20,000,000	
			PFH _D		7.71x10 ⁻⁹	
			MTTF _D		301.9 (n _{op} : 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.

Ordering Information

MODEL NUMBER CONFIGURATOR

3-Way 2-Position Valves

DM2C

N

B21

A

2

1

Series

Port Thread

Basic Size

Current

Voltage *

NPT

G

In

Out

Exhaust

DC

AC

N

D

B20

B21

B42

A54

A55

A66

A88

A

B

C

* For other voltages consult ROSS.

Solenoid Connection Type *

Voltage

DIN EN 175301-803
(connectors sold separately)

AC or DC

Leave Blank

M12

DC only

005

* See accessories for connectors or wiring kits options.

Status Indicator Type *

Connection

Voltage

Mechanical Pressure Switch
(connector included)

DIN EN 175301-803

AC or DC

M12

DC only

Solid State Pressure Sensor
(built-in connector)

M12 only

DC only

None

* See accessories for wiring kits options.

Reset Type

Solenoid

Model Number examples: DM2CDB20A21005, DM2CDB21A21005.

Size				Flow Cv (NI/min)		≈ Weight # lb (kg)	Simplified Schematic
Basic	Port 1	Port 2	Port 3	1-2	2-3		
2	1/4	1/4	3/4	1.7 (1700)	2.6 (2600)	5.3 (2.4)	
	3/8	3/8	3/4	2.2 (2200)	3.6 (3500)		
4	1/2	1/2	1	3.0 (3000)	6.5 (6400)	5.9 (2.6)	
8	3/4	3/4	1	4.2 (4100)	9.4 (9300)	8.4 (3.7)	
	1	1	1	4.3 (4200)	9.4 (9300)		
12	1	1	1-1/2	9.0 (8900)	17 (17000)	15.3 (3.7)	
30	1-1/2	2	2-1/2	20 (20000)	55 (54000)	34.7 (15.1)	
# Valve and base assembly with status indicator.							

Safety Solutions Options

Safe Air Entry System Assemblies with DM²® Series C Double Valves

Air Entry System Assemblies with manual Lockout L-O-X[®] valve, air preparation FRL combinations, and Safe Exhaust Double Valves are available.

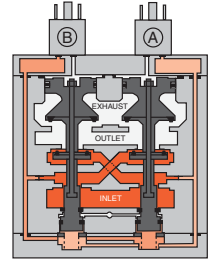


These valves are not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM²® Series D double valves for mechanical power press applications.

Valve Operation

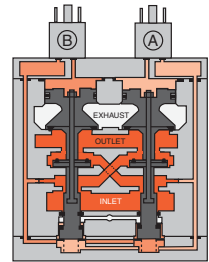
Valve De-actuated (ready-to-run)

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. (Air passages shown out of position and reset adapter omitted for clarity.)



Valve Actuated

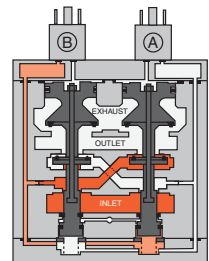
Energizing the pilot valves simultaneously applies pressure to both pistons, forcing the internal parts to move to their actuated (open) position, where inlet air flow to crossover passages is fully open, inlet poppets are fully open and exhaust poppets are fully closed. The outlet is then quickly pressurized, and pressure in the inlet, crossovers, outlet, and timing chambers are quickly equalized. 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.

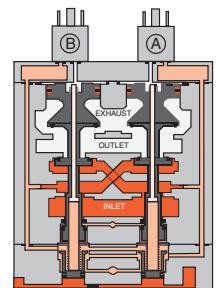
The valve element (side B) that is partially actuated has pilot air available to fully actuate it, but no air pressure on the return piston to fully de-actuate the valve element. Air pressure in the crossover acts on the differential of side B stem diameters creating a latching force. Side A is in a 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

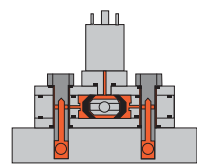
The valve will remain in the locked-out position, even if the inlet air supply is removed and re-applied.

A remote reset signal must be applied to reset the valve. Reset is accomplished by momentarily pressurizing the reset port. 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 pressure can be applied by a remote 3/2 normally closed valve, or from an optional 3/2 normally closed solenoid mounted on the reset adapter. De-actuation of reset pistons causes the reset poppets to close and pilot supply to fully pressurize. Reset air pressure can be applied by a remote 3/2 normally closed valve, or from an optional 3/2 normally closed solenoid, or a manual push button mounted on the reset adapter.



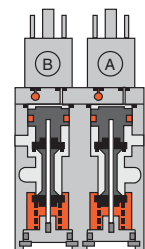
Status Indicator

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.

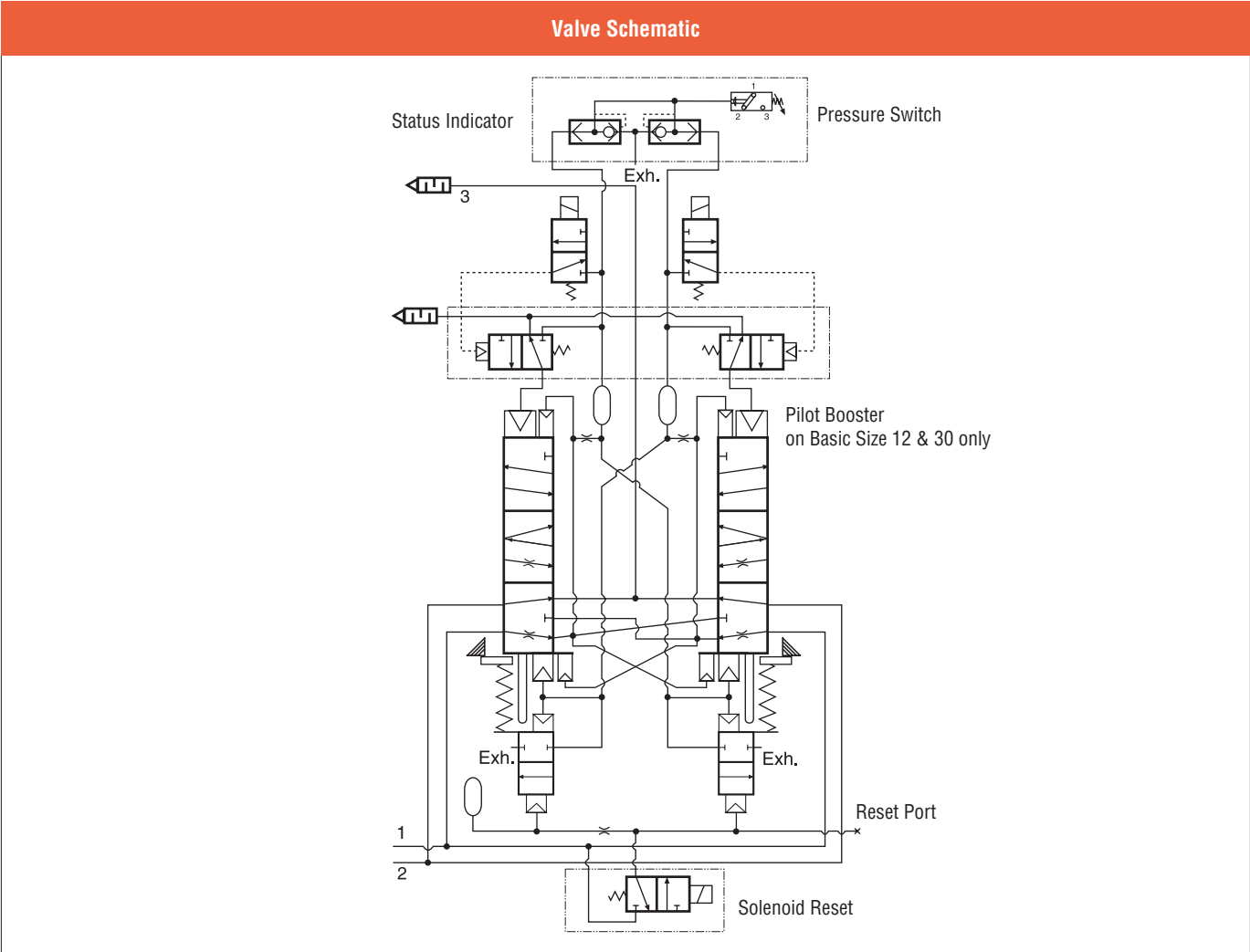


Status Indicator in normal ready-to-run position

Basic Size 12 and 30 valves require relatively large pilots to actuate and de-actuate the main valve elements. In order to achieve extremely quick valve response for such large pilots, a 2-stage solenoid pilot system is incorporated into the design. This keeps the required electrical current to operate the pilots to a minimum.

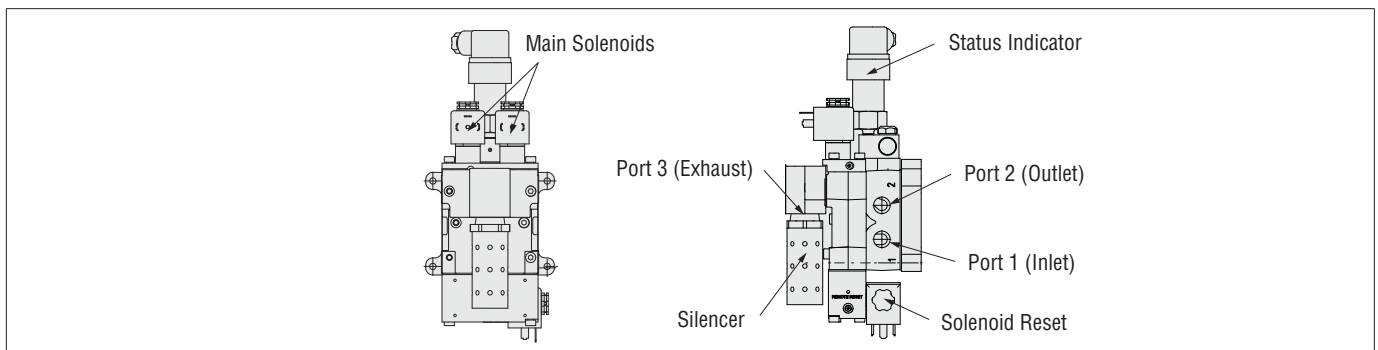


Valve Basic Size 12 & 30 Pilots

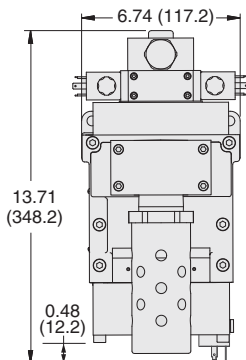
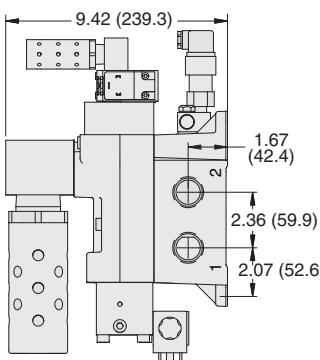
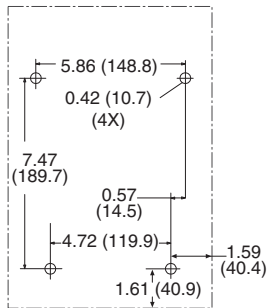
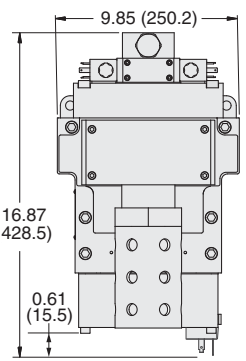
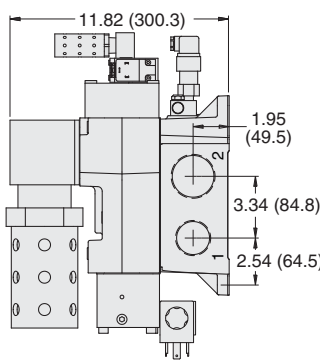
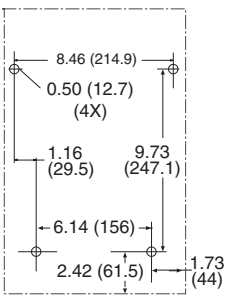


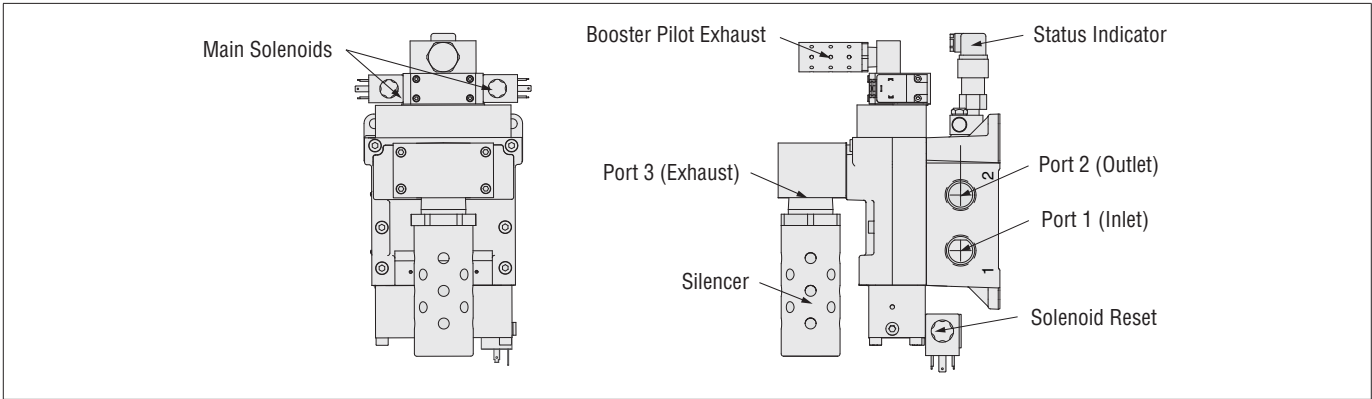
Solenoid & Pressure Switch for Status Indicator Pinouts			
Solenoid	DIN EN 175301-803 Form A		M12
	1 - Positive 2 - Negative 4 - Ground		3 - Positive 4 - Negative
Pressure Switch			
Mechanical Pressure Switch		Solid State Pressure Sensor	
DIN EN 175301-803 Form A	M12	M12	
1 - Common 2 - Normally Closed 3 - Normally Open 4 - Ground (Not Used)	1 - Common 2 - Normally Closed 3 - Not Used 4 - Normally Open	1, 2, 3, 4 - Pin PNP - Switched Positive NO - Normally Open NC - Normally Closed	

DIMENSIONS		Inches (mm)	
Basic	Port	Size	View X (base mounting hole pattern)
2	1/4 & 3/8		
4	1/2		
8	3/4 & 1		
Downloadable CAD models available.			



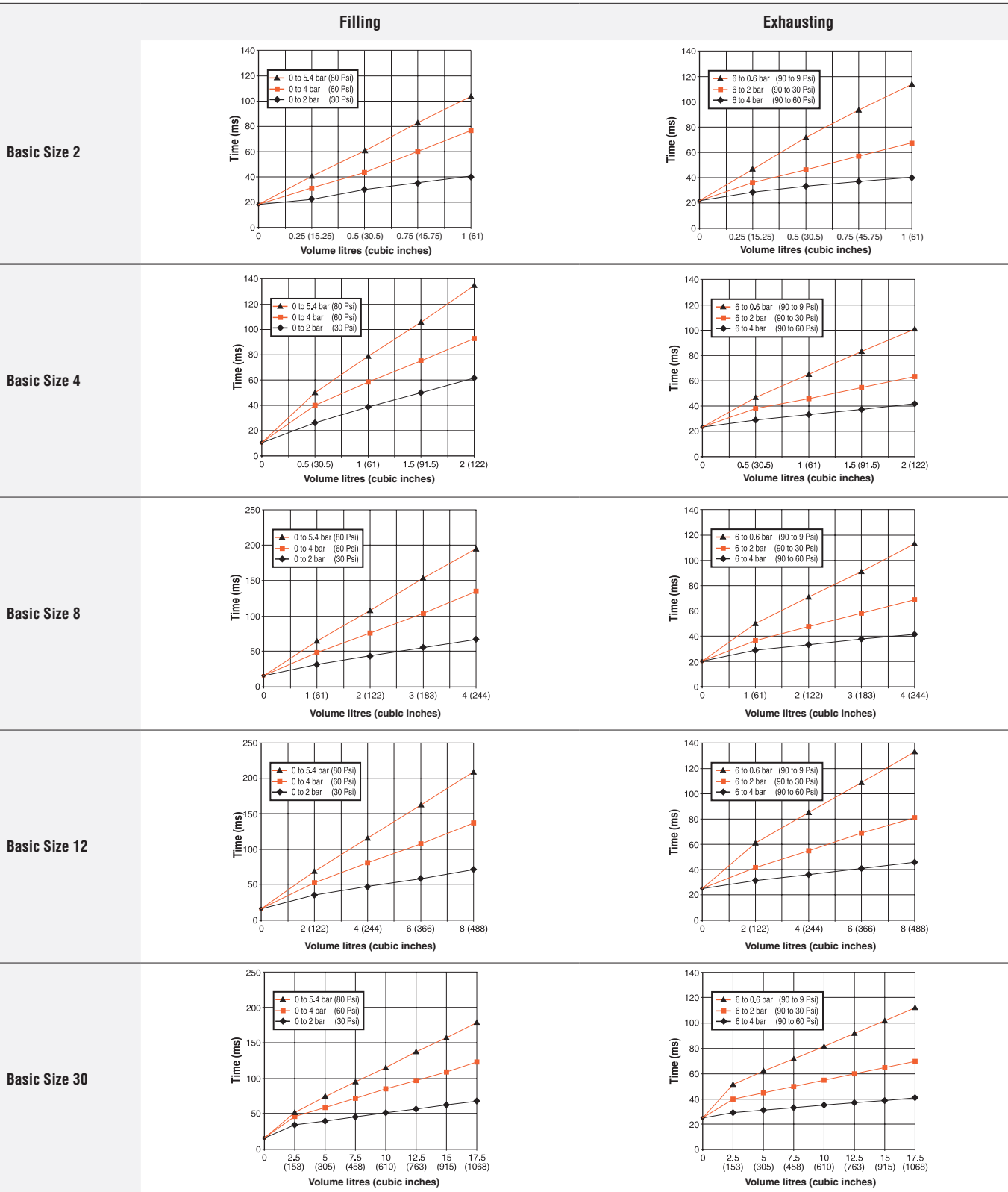
Valve Technical Data

DIMENSIONS		Inches (mm)	
Size		View X (base mounting hole pattern)	
Basic	Port		
12	1		
			
30	2		
			
Downloadable CAD models available.			



VALVE RESPONSE CHARTS

The charts below represent the fill and exhaust times for each of the various sizes of DM²⁰ Series C double valves. The "fill" times were measured while raising (filling) the pressure in a volume from 0 to 30, 60, & 80 psi (0 to 2.1, 4.1, & 5.5 bar) with a 90 psi (6.2 bar) inlet pressure. Conversely, the "exhaust" times were measured while lowering the pressure (exhausting) in a volume from 90 psi (6.2 bar) down to 90 to 60, 30, & 9 psi (4.1, 2.1, & 0.6 bar). Exhausting tests performed with silencer installed.



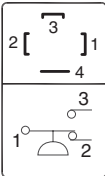
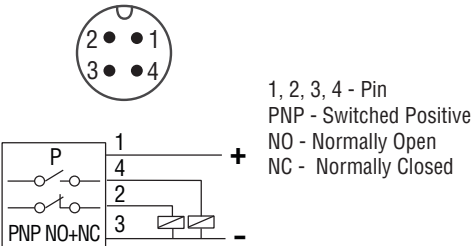
ELECTRICAL STATUS INDICATION

Pressure Switch	Pressure Sensor
	

Illustration examples.

Pressure Switches for Status Indicator	Indicator Type	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
	Mechanical Pressure Switch	DIN EN 175301-803 Form A	1104A30	M10x1	22 (1.5) falling
		M12	1153A30		
	Solid State Pressure Sensor	M12	1335B30W	M10x1	17 (1.2) falling

Status Indicator Assemblies	Indicator Type	Connector Type	Model Number	Factory Preset psi (bar)
	Mechanical Pressure Switch	DIN EN 175301-803 Form A	Y670B94	22 (1.5) falling
	Solid State Pressure Sensor	M12	Y766B94	17 (1.2) falling

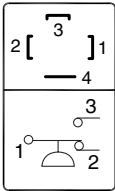
Pinouts		
Mechanical Pressure Switch		Solid State Pressure Sensor
DIN EN 175301-803	M12	M12
 1 - Common 2 - Normally Closed 3 - Normally Open 4 - Ground (Not Used)	 1 - Common 2 - Normally Closed 3 - Not Used 4 - Normally Open	 1, 2, 3, 4 - Pin PNP - Switched Positive NO - Normally Open NC - Normally Closed

ENERGY RELEASE VERIFICATION

Pressure Switch	Redundant Pressure Switch Assembly
	

Illustration examples.

Pressure Switch	Verification Type	Installation Location	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
	Electrical	Pressure Sensing Port or Downstream	DIN EN 175301-803 Form A	586A86	1/8 NPT	5 (0.3) falling
Redundant Pressure Switch Assembly	Verification Type	Installation Location	Connector Type	Model Number	Port Thread	Factory Preset psi (bar)
	Electrical (Dual)	Downstream	DIN EN 175301-803 Form A	RC026-13	3/8 NPT	5 (0.3) falling

Pinout	
DIN EN 175301-803	
	1 - Common 2 - Normally Closed 3 - Normally Open 4 - Ground (Not Used)

PREWIRED ELECTRICAL CONNECTORS

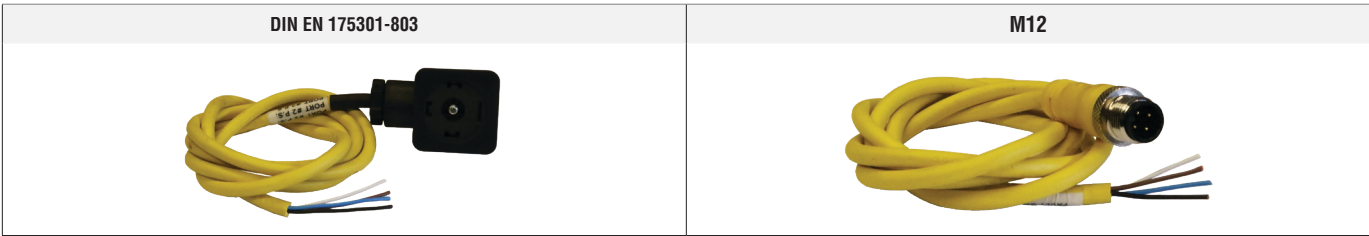
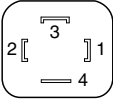
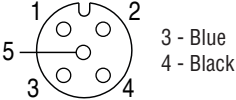
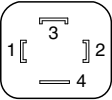
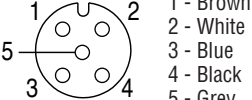


Illustration examples.

Prewired Connector Kits	Cable						Kit Number			
	End 1	End 2	Length meters (feet)	Connection	Quantity Included	Cord Diameter mm	Without Light	Lighted Connector *		
	Connector	Cord						24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Flying leads	5 (16.4)	Solenoid	3	6	2283H77	2532H77-W	2532H77-Z	2532H77-Y
				Status Indicator	1					
			10 (32.8)	Solenoid	3	6	2284H77	2533H77-W	2533H77-Z	2533H77-Y
				Status Indicator	1					
M12 5-pin, Female	Flying leads	5 (16.4)	Solenoid	3	6	2288H77	—	—	—	
			Status Indicator	1						
		10 (32.8)	Solenoid	3	6	2289H77	—	—	—	
			Status Indicator	1						

Prewired Connectors	Cable						Model Number			
	End 1	End 2	Connection	Quantity Included	Length meters (feet)	Cord Diameter mm	Without Light	Lighted Connector *		
	Connector	Cord						24 V DC	120 V AC	230 V AC
	DIN EN 175301-803 Form A	Flying leads	Solenoid	1	2 (6.5)	6	721K77	720K77-W	720K77-Z	720K77-Y
				1	2 (6.5)	10	371K77	383K77-W	383K77-Z	383K77-Y
	M12 5-pin, Female	Flying leads	Status Indicator	1	5 (16.4)	6	2241H77	—	—	—
				1	10 (32.8)	6	2242H77	—	—	—

Connector Pinouts			
Solenoid		Status Indicator	
DIN EN 175301-803	M12	DIN EN 175301-803	M12
 1 - Black 2 - Black 3 - Green/Yellow (Ground) 4 - (Ground)	 1 - Blue 2 - Black 3 - Blue 4 - Black 5 - Blue	 1 - Brown 2 - Grey 3 - Black 4 - Green/Yellow (Ground) 5 - (Ground)	 1 - Brown 2 - White 3 - Blue 4 - Black 5 - Grey

* Lights in connectors with a translucent housing can be used as indicator lights to show when solenoids are energized.

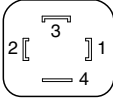
Accessories

ELECTRICAL CONNECTORS

Cable Grip	
Without Light	With Light
	

Illustration examples.

Connectors	Connector					Model Number			
	Type	Connection	Fitting Connection	Quantity Included	Cord Diameter mm	Without Light	Lighted Connector *		
							24 V DC	120 V AC	230 V AC
DIN EN 175301-803 Form A	Solenoid		Cable grip	1	8 to 10	937K87	936K87-W	936K87-Z	936K87-Y
			1/2" NPT conduit	1	—	723K77	724K77-W	724K77-Z	724K77-Y

Connector Pinout	
DIN EN 175301-803	
 1 - Black 2 - Black 4 - Green/Yellow (Ground)	

* Lights in connectors with a translucent housing can be used as indicator lights to show when solenoids are energized.

JUNCTION BOX OPTIONS

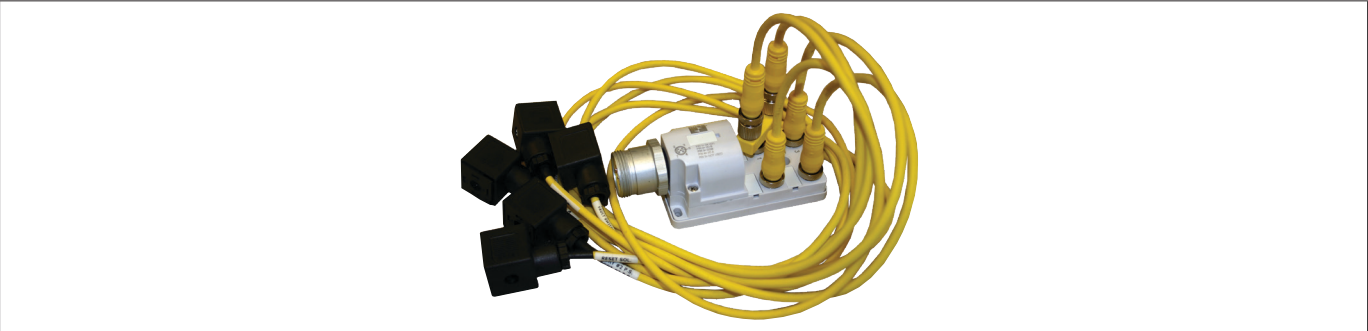


Illustration example.

Wiring Kits with J-Box	J-Box			Cable				Kit Number
	Connection		J-Box Quantity	Connector Type		Quantity Included	Length feet (meters)	
	Control System	Solenoids / Status Indicator		End 1	End 2			
	10-pin Mini	M12 (5-pin)	1	M12	DIN EN 175301-803 Form A	4	3.3 (1)	
		1	M12	M12	4	3.3 (1)	2250H77	

Connectors Pinout and Wiring Diagram

J-Box Wiring

Dimensions: Inches (mm)

10 Pin Pin #	Port 1 Pin #	Port 2 Pin #	Port 3 Pin #	Port 4 Pin #
(V+) 1	1	1	1	1
(V-) 2	3	3	3	3
3	2			
4	4			
5		4		
6			2	
7			4	
8		2		
9				2
10				4

JUNCTION BOX OPTIONS

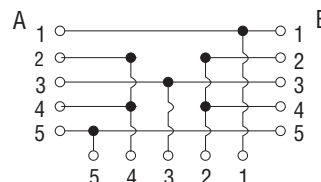
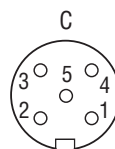
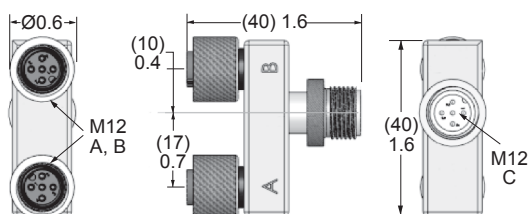
10-Pin MINI Cables	Connection	Cable					Kit Number
		End 1	End 2	Conductors Type	Quantity Included	Length feet (meters)	
J-Box to Control System	10-pin Mini	Flying leads	18-gauge wire		1	12 (3.7)	2253H77
					1	20 (6.1)	2254H77
					1	30 (9.1)	2255H77
					1	50 (15.2)	2256H77

Outlet Port Pressure Monitoring Wiring Kit	Port Splitter			Cable				Kit Number
	Port Connectors	Number of Ports	Splitter Quantity	End 1	End 2	Quantity Included	Length feet (meters)	
				Connector	Connector			
	M12	3	1	M12	DIN EN 175301-803 Form A	1	3.3 (1)	

10-Pin MINI Cable				
PIN #	Wire Colors	PIN #	Wire Colors	
1 +24 V DC	Orange	6 -	Orange w/Black	
2 Common V DC	Blue	7 Remote Reset	Red	
3 -	White w/Black	8 -	Green/Yellow	
4 Solenoid A	Red w/Black	9 Remote Valve Fault Light	Black	
5 Solenoid B	Green w/Black	10 Remote System OK Light	White	

Outlet Port Pressure Monitoring – Port Splitter

Dimensions: Inches (mm)



A & B Female
C Male

HIGH FLOW NOISE REDUCTION SILENCER KITS

Silencers	Pressure Range psig (bar)	
	0-125 (0-8.6) maximum	
	Reduces the Exponentially Perceived Noise (EPNdB), impact noise reduction in the 17–25 dB range. Kits include all plumbing required for installation.	

DM Valve Basic Size	Model Number		Flow scfm (NL/s)	≈ Dimensions * inches (mm)			
	NPT Thread	R/Rp Thread		Width	Height (NPT)	Height (R/Rp)	Depth
2	2323H77	2328H77	800 (380)	4.96 (126.1)	14.24 (361.7)	16.05 (407.7)	5.73 (145.5)
4	2324H77	2329H77	800 (380)	4.34 (110.2)	19.06 (484.1)	21.40 (543.6)	7.27 (184.7)
8	2325H77	2329H77	800 (380)	5.41 (137.4)	21.18 (538.0)	23.52 (597.4)	8.41 (213.6)
12	2326H77	2330H77	2100 (980)	6.74 (117.2)	25.85 (656.6)	28.20 (716.3)	10.66 (270.8)
30	2327H77	2331H77	7200 (3400)	9.85 (250.2)	41.55 (1055.4)	41.55 (1055.4)	13.47 (342.1)
* Dimensions reflect valve with installed silencer.							

CAUTIONS, WARNINGS And STANDARD WARRANTY



ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, and AUTOMATIC VALVE INDUSTRIAL, collectively the “ROSS Group”.

PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure all sources of energy are turned off, the entire pneumatic system is shut down and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS Group Products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any product can be tampered with and/or need servicing after installation, persons responsible for the safety of others or the care of equipment must check ROSS Group Products on a regular basis and perform all necessary maintenance to ensure safe operating conditions.
3. All applicable instructions should be read and complied with before using any fluid power system to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use. If you have any questions, call your nearest ROSS Group location.
4. Each ROSS Group Product should be used within its specification limits. In addition, use only ROSS Group components to repair ROSS Group Products.

WARNINGS:

Failure to follow these instructions can result in personal injury and/or property damage.

FILTRATION and LUBRICATION

1. Dirt, scale, moisture, etc., are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, best performance will be realized if a filter is installed to clean the air supply, thus preventing contaminants from interfering with the proper performance of the equipment. The ROSS Group recommends a filter with a 5-micron rating for normal applications.
2. All standard ROSS Group filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition and hazardous leakage. Immediately replace crazed, cracked, or deteriorated bowls.
3. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum base oils with oxidation inhibitors, an aniline point between 180°F (82°C) and 220°F (104°C), and an ISO 32, or lighter, viscosity. Avoid oils with

phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks personal injury, and/or damage to property.

WARNINGS:

Failure to follow these instructions can result in personal injury and/or property damage.

AVOID INTAKE/EXHAUST RESTRICTION

1. Do not restrict air flow in the supply line. To do so could reduce the pressure of the supply air below minimum requirements for the valve and thereby causing erratic action.
2. Do not restrict a valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and must have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.

SAFETY APPLICATIONS

1. Mechanical Power Presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
2. Safe Exhaust (dump) valves without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All Safe Exhaust valve installations should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
3. Per specifications and regulations, the ROSS L-O-X® and L-O-X® with EEZ-ON®, N06 and N16 Series operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

WARNINGS:

Failure to follow these instructions can result in personal injury and/or property damage.

STANDARD WARRANTY

All products sold by the ROSS Group are warranted for a one-year period [with the exception of Filters, Regulators and Lubricators (“FRLs”) which are warranted for a period of seven (7) years] from the date of purchase. All products are, during their respective warranty periods, warranted to be free of defects in material and workmanship. The ROSS Group's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Group has determined, in its sole discretion, are defective. All warranties become void if a product has been subject to misuse, misapplication, improper maintenance, modification or tampering. Products for which warranty protection is sought must be returned to the ROSS Group freight prepaid.

THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND THE ROSS GROUP EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE ROSS GROUP MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT IS THE ROSS GROUP LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF THE ROSS GROUP MAY EXTEND THE LIABILITY OF THE ROSS GROUP AS SET FORTH HEREIN.



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