



SAFE EXHAUST DOUBLE VALVES M35 SERIES

PRODUCT CATALOG



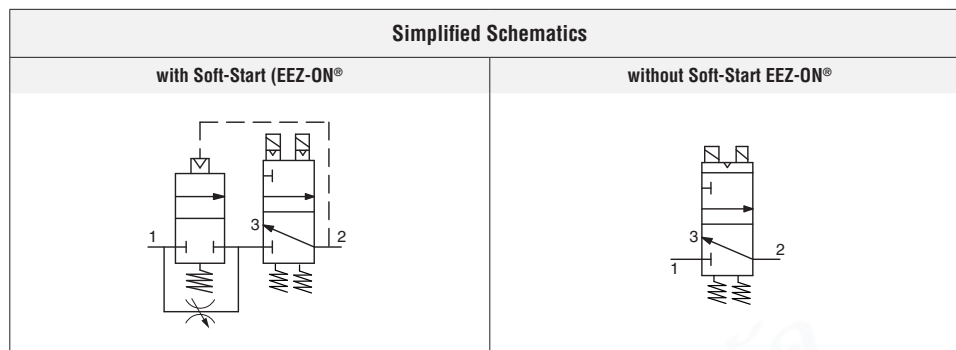
Safe Exhaust Control Reliable Double Valves M35 Series

Product Overview



Safe Exhaust Safety Function

The M35 Series valve safety function is to shut off supply or pneumatic energy and to exhaust any pneumatic energy from downstream of the valve.



The M35 Series valve is designed to supply air to a zone or entire machine/system until signaled to shut off and exhaust residual downstream pneumatic energy from the machine. Thus, reducing the hazards associated with the presence of residual energy during employee access and/or minor servicing.

VALVE FEATURES

Redundant Control

Redundant control can achieve Category 4, PL e, when used with proper safety controls

External Monitoring

Each valve element in the M35 Series is equipped with a solid state pressure sensor. Monitoring both of these sensors on each actuation and de-actuation of the M35 Series valve provides a diagnostic coverage up to 99%.

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

Optional Soft-Start Module

On energization, the Soft-Start (EEZ-ON®) module allows outlet pressure to increase at a slower rate until it reaches approximately 50% of inlet pressure, at which point the valve will then open fully to finish filling the system at full rate

Threaded or Modular Port Connection

Modular port connection allows modular connection to Air Entry System (Lockout Valve, FRLs)

LED Indicators

Provides visual display of valve status and aids troubleshooting

Silencer Option

Include built-in module or threaded flange for remote exhaust

SISTEMA Library

Available for download at rosscontrols.com

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

STANDARD SPECIFICATIONS

GENERAL	Function		Safe Exhaust
	Construction Design		3/2 Valve, Dual Poppet
	Actuation		Electrical – Solenoid pilot operated with air assisted spring return; one solenoid per valve element (2 total), both to be operated synchronously
	Mounting	Type	Inline mounted - modular/threaded
		Orientation	Any, preferably vertical
	Connection		Threaded; G, NPT
	Monitoring		Dynamic, cyclical, external with customer supplied equipment. Monitoring should check state of both valve pressure sensors with any and all changes in state of valve control signals.
Minimum Operation Frequency		Once per month, to ensure proper function	

OPERATING CONDITIONS	Temperature	Ambient	40° to 120°F (4° to 50°C)
		Media	40° to 175°F (4° to 80°C)
	Flow Media		Compressed air according to ISO 8573-1 Class 7:4:4
	Operating Pressure		30 to 150 psig (2 to 10 bar)
	Pressure Sensors (2 per valve)		PNP solid state
	Pressure Sensors Current Consumption (each sensor)		<23mA (each without contacts)

ELECTRICAL DATA	Solenoids		Enclosure rating according to DIN 400 50 IP 65 Two solenoids, rated for continuous duty
	Operating Voltage		24 volts DC
	Power Consumption (each solenoid)		1.5 watts
	Enclosure Rating		IP65, IEC 60529
	Electrical Connection		Two 5-pin M12 connectors
	Pressure Switch (Status Indicator) Rating		Contacts - 5 amps at 250 volts AC, or 5 amps at 30 volts DC

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}	25,000,000
		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.

PRODUCT CREDENTIALS

Safety Category	DGVV (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

Ordering Information

MODEL NUMBER CONFIGURATOR

3-Way 2-Position Valves

M35 **S** **40** **G** **A** **E** **X** **AA** **G** **A**

Series
M35

Soft-Start Function
With Soft-Start **S**
No Soft-Start **X**

Thread
G **G**
NPT **N**

Monitoring
External

Voltage
24 volts DC

Communication
None

Revision Level
G **A**

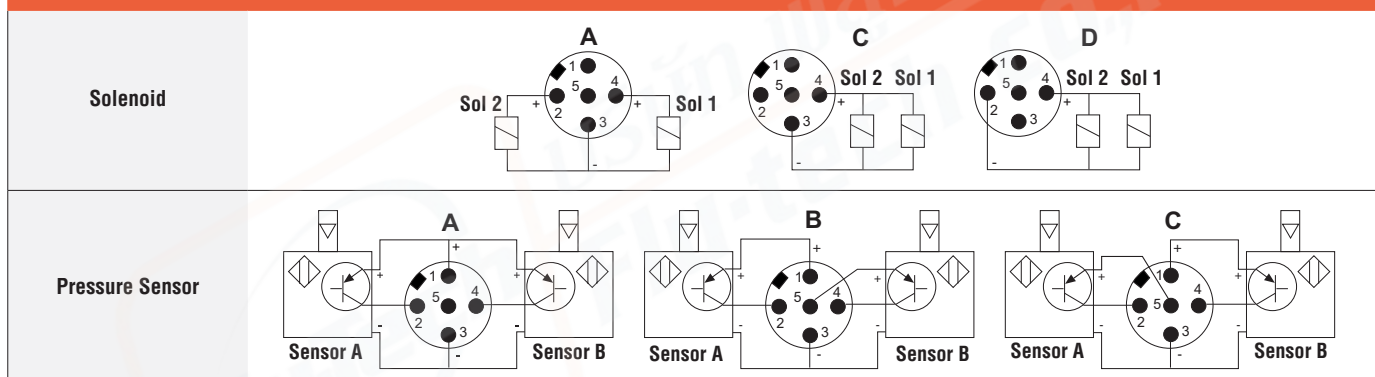
Pressure Measuring Device
With Gauge **G**
No Gauge **X**
With Transducer **T**

Port Size			Exhaust Type	
Inlet	Outlet	Exhaust		
1/2	1/2	-	Built-in Silencer	40
3/4	3/4	-	Built-in Silencer	50
1/2	1/2	1	Threaded Exhaust Flange*	46
3/4	3/4	1	Threaded Exhaust Flange*	56

* Silencer not included but recommended, see accessories.

Pin Configuration Combination*					
Solenoid	Sensor		Solenoid	Sensor	
A	A	AA	C	C	CC
A	B	AB	D	B	DB
A	C	AC	D	C	DC

Valve Connector Pinouts



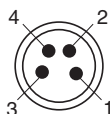
Port Size	Basic Size	Soft-Start	Valve with Built-in Silencer			Valve with Threaded Exhaust Flange		
			Cv		Weight lb (Kg)	Flow Cv		Weight lb (Kg)
			1-2	2-3		1-2	2-3	
1/2	8	With	4.1	7.5	6.5 (2.9)	4.1	7.57	6.6 (3.0)
		Without	4.3	7.5	4.2 (1.9)	4.3	7.57	4.3 (2.0)
3/4	8	With	4.1	7.5	6.5 (2.9)	4.1	7.57	6.6 (3.0)
		Without	4.3	7.5	4.2 (1.9)	4.3	7.57	4.3 (2.0)

Digital Pressure Transducer Specifications

Pressure Range psig (bar)	Electrical Output	Electrical Connection	Pressure Port Size/Type	Weight lb (Kg)
0 (0) to 145 (10)	(1) PNP with (1) 4-20ma	M8, 4 Pin	1/8 Male	0.099 (0.045)

Connector Pinout

Sensor Pinout with Analog Output



- 1 - Brown - 24 VDC
- 2 - White - 4 to 20mA
- 3 - Blue - 0 VDC
- 4 - Black PNP Open Collector Output 1



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Safe Air Entry System Assemblies with M35 Series Double Valves

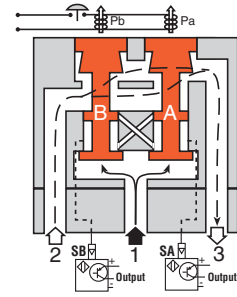
Air Entry System Assemblies with manual Lockout L-O-X® valve, air preparation FRL combinations, M35 Series Safe Exhaust Double Valve with or without Soft-Start module, and with Drip Leg option are available.



Valve Operation

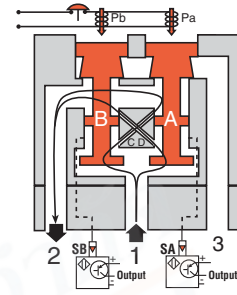
Conditions at Start

Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both sensors SA and SB are exhausted. Sensors outputs SA and SB are ON.



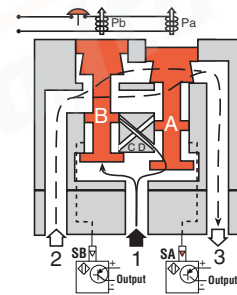
Normal Operation

Simultaneously energizing both solenoids actuates both pilots and causes valve elements A and B to shift. Inlet 1 is then connected to outlet 2 via crossflow passages C and D. Exhaust 3 is closed. Sensing pressure signals go to each pressure sensor and become equal to inlet pressure. Sensors outputs SA and SB are OFF.



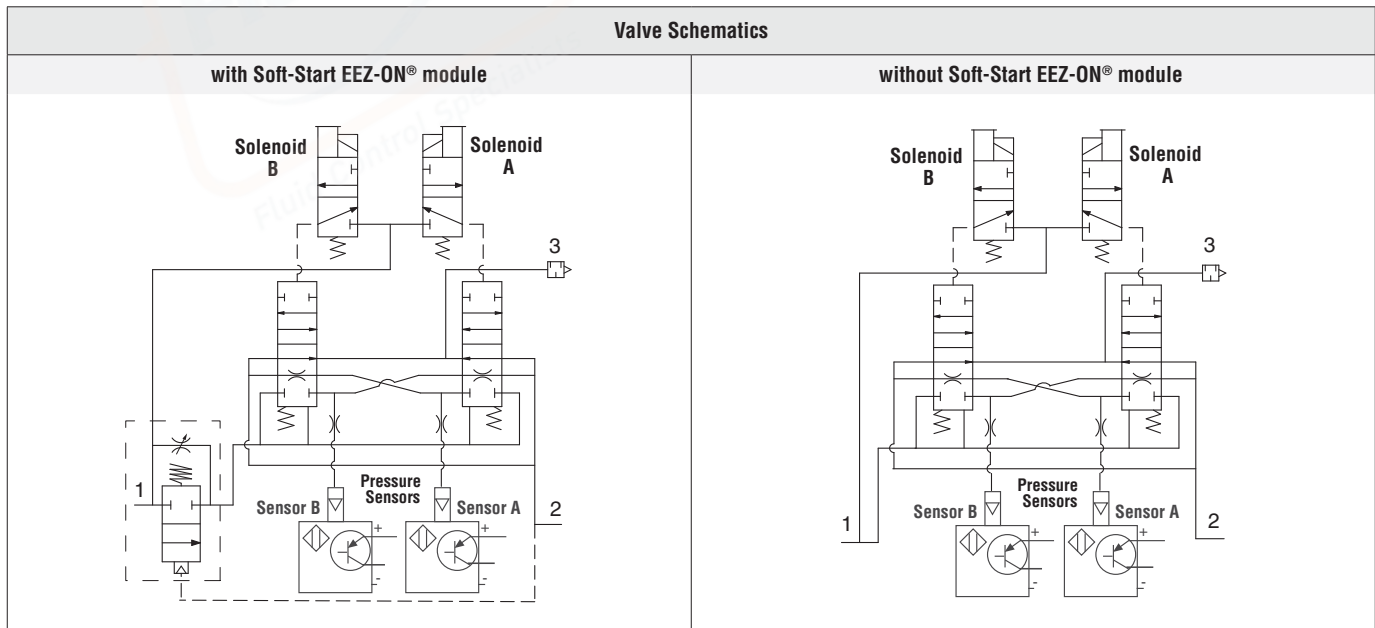
Detecting a Malfunction

A malfunction in the system or the valve itself could cause one valve element to be open and the other closed. Air then flows past the inlet poppet on valve element A, into crossflow passage D, but is substantially blocked by the spool portion of element B. The large size of the open exhaust passage past element B keeps the pressure at the outlet port below 2% of inlet pressure. Full sensing air pressure from side A goes to sensor SA, and a reduced pressure goes to sensor SB. This full pressure signal causes sensor outputs SA to turn OFF. Sensor outputs SB, with a reduced pressure signal, does not turn OFF. An external monitoring system can detect the malfunction by monitoring the condition of the sensors SA and SB. The external monitoring system may then react accordingly by shutting down the power to the valve solenoids and any other components deemed necessary to stop the machine.

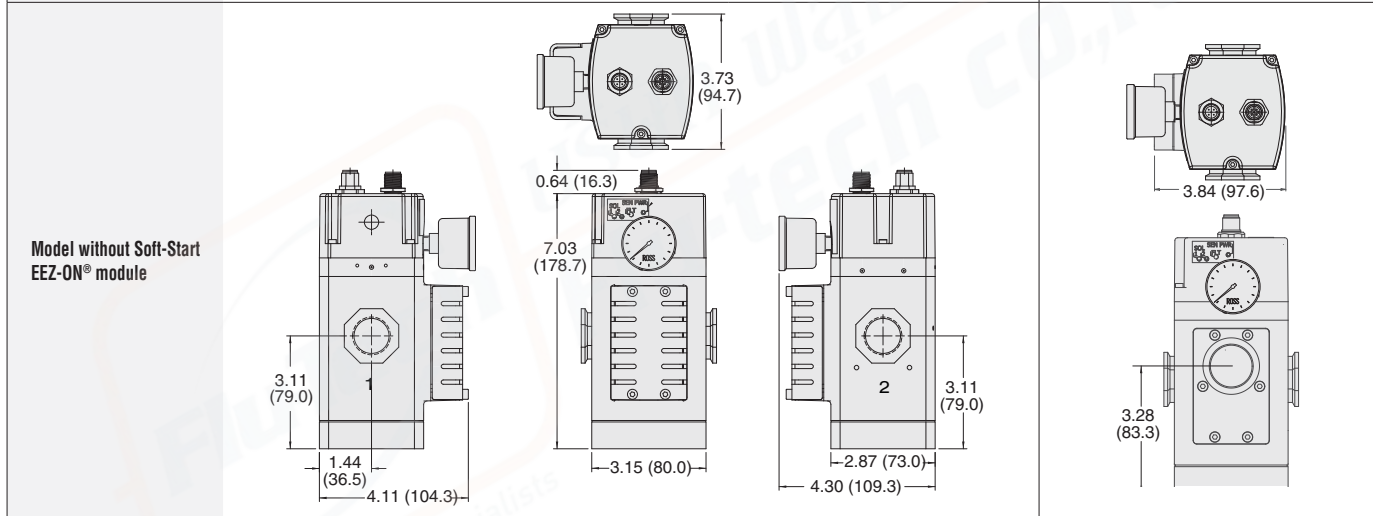
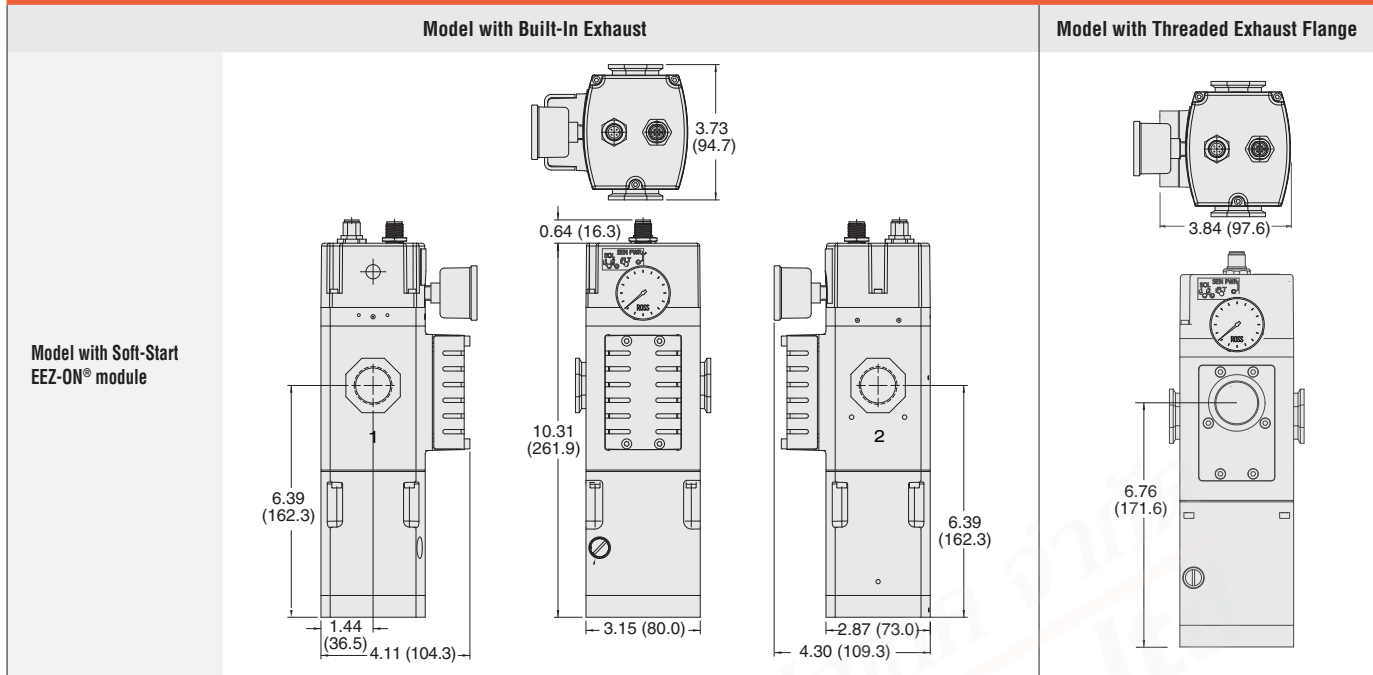


Valve Reset

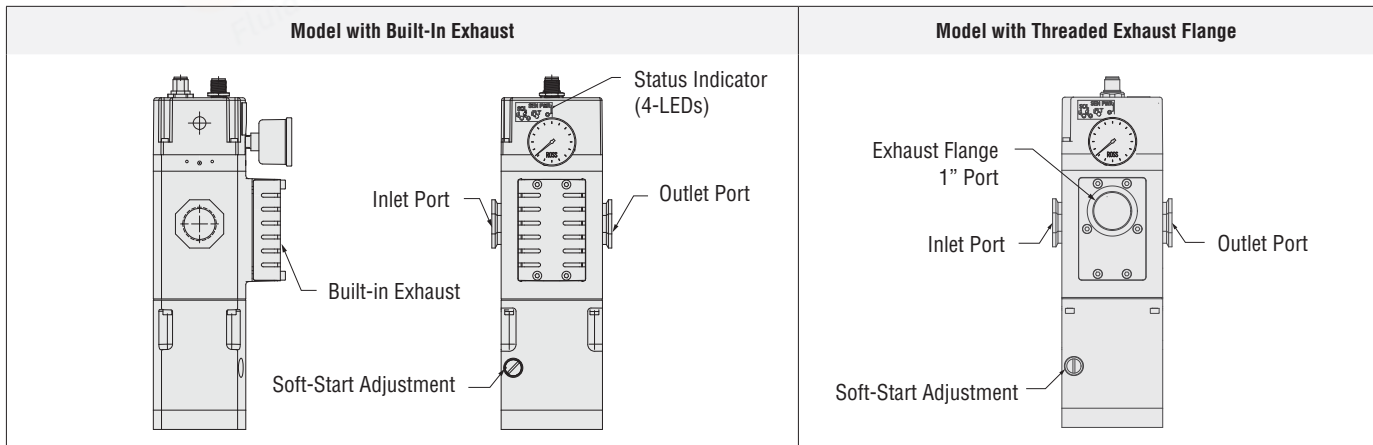
Automatic reset by de-energizing the solenoids.



DIMENSIONS



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 www.rosscontrols.com.



Valve Technical Data

EXHAUST TIME													
Normal and Faulted Condition (s)													
Volume ft ³ (L)	Condition	Valve with Built-in Silencer						Valve with Threaded Exhaust Flange					
		Operating Pressure psig (bar)						Operating Pressure psig (bar)					
		30 (2)		90 (6)		145 (10)		30 (2)		90 (6)		145 (10)	
		to 15 (1)	to 7 (0.5)	to 15 (1)	to 7 (0.5)	to 15 (1)	to 7 (0.5)	to 15 (1)	to 7 (0.5)	to 15 (1)	to 7 (0.5)	to 15 (1)	to 7 (0.5)
0.071 (2)	Normal	0.055	0.071	0.094	0.112	0.120	0.135	0.052	0.070	0.093	0.113	0.123	0.142
	Faulted	0.072	0.098	0.147	0.183	0.200	0.247	0.065	0.091	0.137	0.175	0.203	0.272
0.35 (10)	Normal	0.131	0.208	0.317	0.393	0.424	0.507	0.120	0.191	0.308	0.409	0.437	0.520
	Faulted	0.185	0.301	0.533	0.710	0.789	1.024	0.163	0.300	0.503	0.697	0.805	1.048
0.71 (20)	Normal	0.226	0.379	0.597	0.746	0.804	0.971	0.204	0.342	0.577	0.779	0.829	0.992
	Faulted	0.326	0.555	1.016	1.368	1.526	1.997	0.285	0.562	0.961	1.349	1.558	2.017
1.41 (40)	Normal	0.416	0.721	1.155	1.451	1.564	1.899	0.373	0.645	1.115	1.519	1.615	1.937
	Faulted	0.608	1.063	1.983	2.685	3.000	3.941	0.530	1.086	1.878	2.655	3.064	3.957
5.30 (150)	Normal	1.462	2.604	4.227	5.326	5.743	7.006	1.301	2.310	4.071	5.588	5.934	7.130
	Faulted	2.160	3.855	7.298	9.929	11.107	14.635	1.874	3.968	6.919	9.834	11.345	14.622

An Integration Guide for the M35 Series valves is available from ROSS to provide information such as operation & monitoring, and validation test procedure for valve operation and external monitoring logic.

[Integration Guide - M35 Series Safe Exhaust Double Valves](#)



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PRESSURE GAUGE

Analog Pressure Gauge	Mounting	Port Size	Thread Type	Model Number	Pressure Range psig (bar)	Case Diameter inches (mm)
	Center Back	1/8	Male	5400A1002	0-160 (0-11)	1.5 (38)

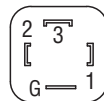
ENERGY RELEASE VERIFICATION

Pressure Switches	Verification Type	Installation Location	Connector Type	Model Number	Factory Preset psi (bar)	Port Thread
	Electrical	Downstream	DIN EN 175301-803 Form A	586A86	5 (0.3) falling	1/8 NPT

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

Connector Pinout

DIN EN 175301-803 Form A



- 1 - Common
- 2 - Normally Closed
- 3 - Normally Open
- G - Ground

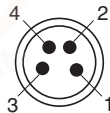
PRESSURE TRANSDUCERS

Digital Pressure Transducers	Monitoring Type	Electrical Connection	Electrical Output	Model Number		Pressure Port Size	Pressure Range psig (bar)	Weight lb (Kg)
	G Thread	NPT Thread						
Electrical	M8, 4 Pin	(1) PNP with (1) 4-20ma	D760B94	760B49	1/8	0 to 145 (0 to 10)	0.099 (0.045)	

For Digital Pressure Readout, Analog 4-20mA Output, and Transistor Switching Output.

Connector Pinout

Sensor Pinout with Analog Output

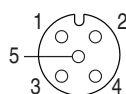


- 1 - Brown - 24 VDC
- 2 - White - 4 to 20mA
- 3 - Blue - 0 VDC
- 4 - Black PNP Open Collector Output 1

ELECTRICAL CONNECTORS

Pre-wired Connector Kits	Connection Type	Connector Type	Connector Contacts Type	End 1	End 2	Length meters (feet)	Kit Number	Quantity
							Without Light	
Sensor and Solenoid (1 each)	M12	5-pin straight A-coded	Female Connector	Flying Leads	5 (16.4)	2644B77	2	
						10 (32.8)	2370B77	2
					5 (16.4)	2645B77	2	
								10 (32.8)

Connector Pinout



- 1 - Brown
- 2 - White
- 3 - Blue
- 4 - Black
- 5 - Grey

Accessories & Options

SILENCERS

Silencers for Threaded Exhaust Flange Option	Port Size	Thread Type	Model Number		Flow Avg. C _v
			R/Rp Thread	NPT Thread	
	1	Male	D5500A6003	5500A6003	14.6

MODULAR CONNECTION

M35 Series valves have both modular receptacles for piping and female threaded ports inside receptacles, which allows either modular connection or direct piping. Mounting accessories listed below are used for modular connection to ROSS MD Series filter-regulator units.

Mounting Brackets & Clamp for Module Connections	Options	Model Number
	Bracket, Screw, Clamp and Mounting Adapter	R-A118-103
	Clamp only	R-A118-105
	Bracket, Screw, and Clamp	R-A118-105M

Port Block and End Ports	Options	Port Size	Model Number	
			G Thread	NPTF Thread
	Extra Port Blocks	1/2	R-118-106-4W	R-118-106-4
Female End Ports	1/2	R-118-100-4W	R-118-100-4	
	3/4	R-118-100-6W	R-118-100-6	
Male End Ports	1/2	R-118-109-4FW	R-118-109-4F	
	3/4	R-118-109-6FW	R-118-109-6F	



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