

RC-M35-OI 01.2019 EN

M35 Series

Safety Exhaust (Dump)

Control Reliable Double Valves
with or without EEZ-ON® (Soft-Start) Module

Operating Instructions



Declaration of CE Conformity and Certifications available for download at www.rosscontrols.com



ORDER KEY (Example)

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

Series: M35
 Soft-Start Function: With Soft-Start S, No Soft-Start X
 Thread: BSPP G, NPT N
 Monitoring: External E
 Communication: None, X
 Voltage: 24 volts DC A
 Pressure Gauge: With Gauge G, No Gauge X
 Revision Level: A

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

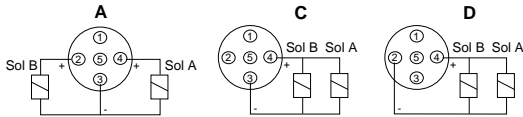
* Silencer not included but recommended.

Pin Configuration Combinations*

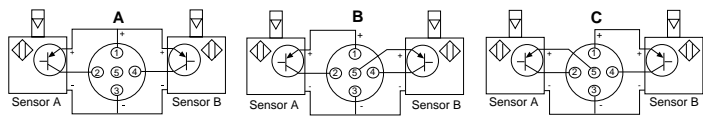
Solenoid Sensor			Solenoid Sensor		
A	A	AA	C	C	CC
A	B	AB	D	B	DB
A	C	AC	D	C	DC

*See Valve Pinout below.

Pinouts - Solenoid



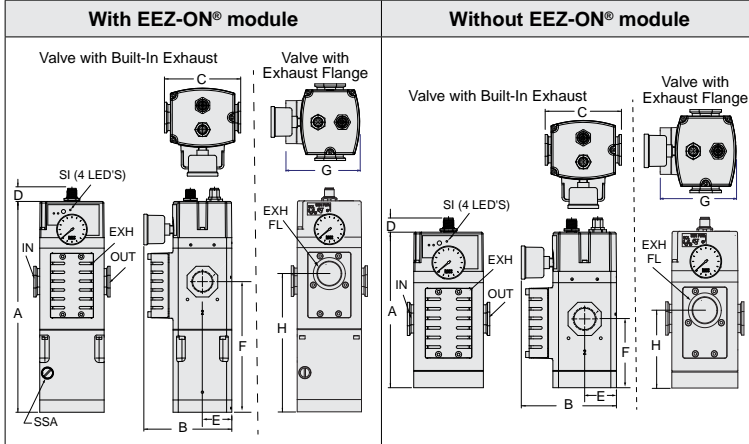
Pinouts - Pressure Sensor



PRODUCT LABEL IDENTIFICATION

Model No: M35X40NAEXDBGA
 Pressure: 30 to 150 PSIG (2 to 10 bar)
 Voltage: 24 VDC
www.rosscontrols.com

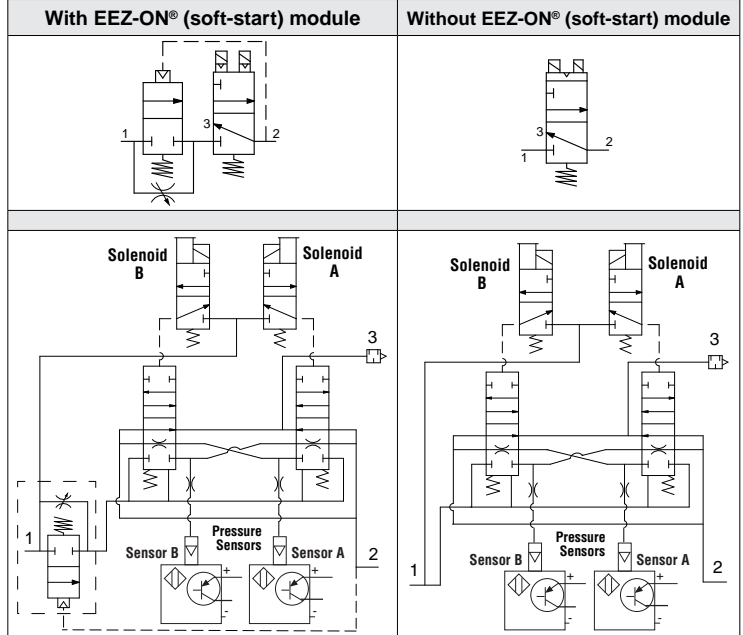
DIMENSIONAL DRAWINGS



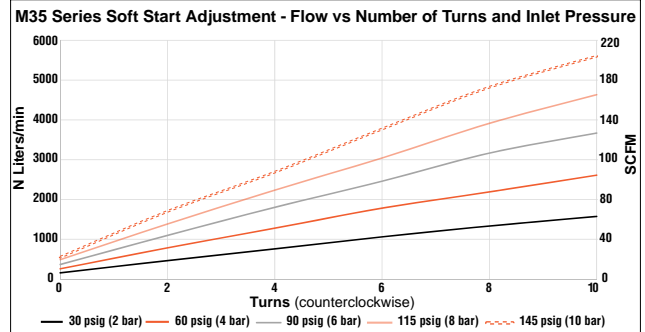
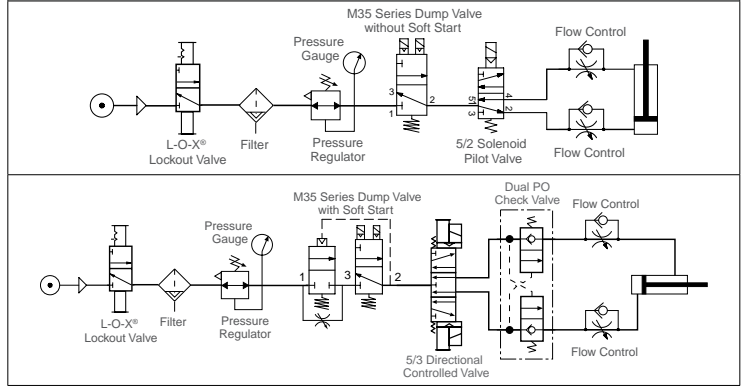
Valve Type	Port Size	Soft-Start	Cv	
			1-2	2-3
Valve with Built-In Exhaust	1/2	With	4.1	7.5
		Without	4.3	
	3/4	With	4.1	
		Without	4.3	
Valve with Threaded Exhaust Flange	1/2	With	4.1	7.90
		Without	4.3	
	3/4	With	4.1	
		Without	4.3	

Index	with EEZ-ON® module	without EEZ-ON® module
	Dimensions - Inches (mm)	
A	10.31 (261.9)	7.03 (178.5)
B	4.30 (109.3)	4.30 (109.3)
C	3.73 (94.7)	3.73 (94.7)
D	0.64 (16.3)	0.64 (16.3)
E	1.44 (36.5)	1.44 (36.5)
F	6.39 (162.3)	3.11 (79.0)
G	3.84 (97.6)	3.84 (97.6)
H	6.76 (171.6)	3.28 (83.3)
IN	Inlet	
OUT	Outlet	
EXH	Exhaust	
SI	Status Indicator	
SSA	Soft-Start Adjustment	
EXH FL	Threaded Exhaust Flange Exhaust	

SCHEMATICS



Application Examples



Exhaust Time - Normal and Faulted Conditions (s)

Volume ft³ (L)	Normal or Faulted	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)						
0.071 (2)	N	0.055 to 0.071	0.071 to 0.094	0.094 to 0.112	0.112 to 0.120	0.120 to 0.135	0.052 to 0.070	0.070 to 0.093	0.093 to 0.113	0.113 to 0.123	0.123 to 0.142		
	F	0.072 to 0.098	0.098 to 0.147	0.147 to 0.183	0.183 to 0.200	0.200 to 0.247	0.065 to 0.091	0.091 to 0.137	0.137 to 0.175	0.175 to 0.203	0.203 to 0.272		
0.35 (10)	N	0.131 to 0.208	0.208 to 0.317	0.317 to 0.393	0.393 to 0.424	0.424 to 0.507	0.120 to 0.191	0.191 to 0.308	0.308 to 0.409	0.409 to 0.437	0.437 to 0.520		
	F	0.185 to 0.301	0.301 to 0.533	0.533 to 0.710	0.710 to 0.789	0.789 to 1.024	0.163 to 0.300	0.300 to 0.503	0.503 to 0.697	0.697 to 0.805	0.805 to 1.048		
0.71 (20)	N	0.226 to 0.379	0.379 to 0.597	0.597 to 0.746	0.746 to 0.804	0.804 to 0.971	0.204 to 0.342	0.342 to 0.577	0.577 to 0.779	0.779 to 0.829	0.829 to 0.992		
	F	0.326 to 0.555	0.555 to 1.016	1.016 to 1.368	1.368 to 1.526	1.526 to 1.997	0.285 to 0.562	0.562 to 0.961	0.961 to 1.349	1.349 to 1.558	1.558 to 2.017		
1.41 (40)	N	0.416 to 0.721	0.721 to 1.155	1.155 to 1.451	1.451 to 1.564	1.564 to 1.899	0.373 to 0.645	0.645 to 1.115	1.115 to 1.519	1.519 to 1.615	1.615 to 1.937		
	F	0.608 to 1.063	1.063 to 1.983	1.983 to 2.685	2.685 to 3.000	3.000 to 3.941	0.530 to 1.086	1.086 to 1.878	1.878 to 2.655	2.655 to 3.064	3.064 to 3.957		
5.30 (150)	N	1.462 to 2.604	2.604 to 4.227	4.227 to 5.326	5.326 to 5.743	5.743 to 7.006	1.301 to 2.310	2.310 to 4.071	4.071 to 5.588	5.588 to 5.934	5.934 to 7.130		
	F	2.160 to 3.855	3.855 to 7.298	7.298 to 9.929	9.929 to 11.107	11.107 to 14.635	1.874 to 3.968	3.968 to 6.919	6.919 to 9.834	9.834 to 11.345	11.345 to 14.622		



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 Sitz: Langen • AG: Langen, B412 • Geschäftsführer: Ralf W. Dinkel

CE-Konformitätserklärung (Originalfassung)

Hiermit erklären wir,
 dass alle ROSS®-Zwillingsventile der Baureihe M35

den einschlägigen Bestimmungen folgender Richtlinien entsprechen:
 Maschinenrichtlinie 2006/42/EG

Angewendete harmonisierte Normen:

- EN ISO 13849-1:2015: Sicherheit von Maschinen
 -Sicherheitsbezogene Teile von Steuerungen Teil 1
 EN ISO 13849-2:2012: Sicherheit von Maschinen
 -Sicherheitsbezogene Teile von Steuerungen Teil 2
 EN60204-1:2006-06: Sicherheit von Maschinen
 -Elektrische Ausrüstung von Maschinen Teil 1
 EN ISO 4414:2010-11: Fluidtechnik
 -Allgemeine Regeln und sicherheitstechnische Anforderungen
 an Pneumatikanlagen und deren Bauteile

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:

Klaus Goebel
 Fa. ROSS EUROPA
 Robert-Bosch-Straße 2
 63225 Langen

Zertifizierungsstelle der Baumusterprüfung:

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 Fachbereich Holz und Metall
 Kreuzstraße 45
 40210 Düsseldorf
 Tel.: 0211 8224-16910
 Fax: 0211 8224 26910
 pz-hsm.fbhm@bghm.de
<http://www.dguv.de/fb-holzundmetall/pruefstellen/hebezeuge>
 Kurzzeichen: HSM
 Benannte Stelle der EU, Kennnummer: 0393
 (Zertifizierung eingeleitet)

Langen, 28. Juli 2017

Unterschrift



Dietrich Warmbier
 Global Safety Product Manager



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Declaration of CE Conformity (Translation from German-language Original)

Herewith we declare
 that all ROSS® double valve M35

are in full accordance with the following Directive:
 Machinery Directive 2006/42/EC

Applied harmonized standards:

- EN ISO 13849-1:2015: Safety of Machinery
 - Safety related parts of a control system - Part 1
 EN ISO 13849-2:2012: Safety of Machinery
 - Safety related parts of a control system - Part 2
 EN60204-1:2006-06: Safety of Machinery
 - Electrical equipment of machines - Part 1
 EN ISO 4414:2010-11: Pneumatic Fluid Power
 - General Rules and Safety Requirements for Pneumatic
 Systems and their Components

Authorized person for the compilation of technical documentation:

Klaus Goebel
 ROSS EUROPA GmbH
 Robert-Bosch-Straße 2
 63225 Langen / Germany

Certification Body for Type Testing:

DGUV Test
 Prüf- und Zertifizierungsstelle Hebezeuge, Sicherheitskomponenten und Maschinen
 Fachbereich Holz und Metall
 Kreuzstraße 45
 40210 Düsseldorf
 Tel.: 0211 8224-16910
 Fax: 0211 8224 26910
 pz-hsm.fbhm@bghm.de
<http://www.dguv.de/fb-holzundmetall/pruefstellen/hebezeuge>
 Reference: HSM
 Notified Body within the European Union, ID-No.: 0393
 (Certification pending)

Langen, July 28, 2017

Signature



Dietrich Warmbier
 Global Safety Product Manager

1. About this Documentation

These instructions contain important information for the safe and appropriate assembly and commissioning of the product.

- ▶ Read these instructions all the way through, particularly section 6.4 “Safety instructions,” before working with the product.

Additional documentation:

- SISTEMA libraries
- DGUV (formerly BG) certificate: German professional association
- Technical documents

For more information see last page for contact information, or visit www.rosscontrols.com.

- ▶ In addition, observe all applicable local and national regulations on accident prevention and on environmental protection.

1.1. Warning Notices in these Operating Instructions

In these operating instructions, warning notices precede sections with handling requirements which incur risks of personal injury or material damage.

Warnings are structured as follows:

	SIGNAL WORD
Type or source of hazard!	
Consequences	
▶ Measures to avert danger	

- **Warning triangle:** Indicates a risk of fatal or severe injuries.
- **Signal word:** Indicates the severity of the danger.
- **Type or source of hazard:** States the type of danger or the source of the hazard.
- **Consequences:** Describes possible consequences of ignoring the warning.
- **Measures to avert danger:** Indicates how to avoid the danger. It is essential that the measures to avert danger are complied with.

	DANGER	Indicates an imminent and serious danger that will result in severe or even fatal injury if you fail to avoid it.
	WARNING	Indicates a possible danger that could result in severe or even fatal injury if you fail to avoid it.
	CAUTION	Indicates a danger that may result in minor to moderate injuries if you fail to avoid it.
ATTENTION		Indicates potential property damage that may be incurred by the product or its surroundings if you fail to avoid it.

2. Product Identification

Date of manufacture and site of manufacture are permanently stamped:

Manufacturing site	Site abbreviation	Valve printing (example May 2016)
ROSS CONTROLS USA	(L)	(5 16 L)
ROSS EUROPA	(G)	(5 16 G)
ROSS UK	(RB)	(5 16 RB)
ROSS ASIA	(J)	(5 16 J)
ROSS SOUTH AMERICA	(B)	(5 16 B)
ROSS CONTROLS CHINA	(C)	(5 16 C)
ROSS CONTROLS INDIA	(RCI)	(5 16 RCI)

See back page for ROSS addresses.

Product label identification & product key identification example, see page 2.

3. Prerequisites for Use of the Product

- ▶ Make these operating instructions available to the engineer and assembly technician of the machine/system in which the product will be used.
- ▶ Keep these operating instructions for the entire product life cycle.

3.1. Qualified Personnel

Assembly, installation, commissioning, maintenance, and decommissioning should only be carried out by qualified personnel that have the required knowledge of and experience in dealing with electrical and pneumatic control technology.

4. Package Contents

Items included:

- M35 Series valve
- Operating instructions

5. Service, Repair, and Maintenance

- ▶ In case of technical problems or a required repair, please contact your local ROSS representative. If used properly, the M35 Series valves will not require maintenance. Unless otherwise required, ROSS recommends performing a functional test at least annually (see 8.1 Test Procedure).

6. Notes on Safety

The product has been manufactured according to the accepted rules of current technology. There is risk of injury or damage if the following safety instructions and warnings given in this instruction manual are not observed.

6.1. Intended Use

The M35 Series of double valves are safety components designed and manufactured in accordance with Machinery Directive 2006/42/EC and bear the CE mark. The M35 Series double valves are redundant 3/2 valves that are designed to meet the needs and requirements of safe air supply/exhaust applications for machinery with pneumatic controls. Typically, these valves are implemented to meet the Category 4 and/or Performance Level e requirements of a machine's (or system's) safety circuit as determined by a risk assessment of the hazards and tasks required of employees that interact with the machine/system.

- ▶ See section 10 “Technical Data” for the standards and test values complied with and adhered to by the product. See the declaration of conformity for product-relevant EC directives.

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

Note: The M35 Series valve cannot exhaust pneumatic energy from downstream of obstructions such as check valves and closed center function valves.

The M35 Series valves are designed for external monitoring for safe, redundant operation. The M35 Series valves are constructed of redundant, 3/2 poppet type valves, and have an overall function of a single solenoid pilot-operated, spring return valve. 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%. Monitoring of these sensors is to be done by an external monitoring system.

The M35 Series valves can also be purchased with an EEZ-ON® (soft-start) module. The function of the EEZ-ON® (soft-start) module is to, on energization, allow outlet pressure to increase at a slower than normal 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 flow rate. This feature can be used to lessen the shock of sudden, rapid pressurization of cylinders. This feature is especially useful where inline flow controls are placed into the cylinder control lines in the “meter out” mode. Flow controls mounted in this fashion do not operate sufficiently when the system is initially being refilled with compressed air after the system has been de-pressurized. This causes uncontrolled cylinder speed on the first actuation of the cylinder. The EEZ-ON® (soft-start) feature can remedy this situation by gradually refilling the system. Thus, allowing cylinders to ease into place instead of slamming. When using the EEZ-ON® (soft-start) feature, the time it takes for the outlet pressure to reach approximately 50% of inlet pressure can be changed by adjusting the flow control in the EEZ-ON® (soft-start) module. Turning the flow control clockwise will increase the time it takes the outlet pressure to reach 50% of inlet pressure. Turning the flow control counter-clockwise will reduce this time. This time interval is directly affected by the volume of the system being filled. In larger volume systems the time to reach 50% will be longer than in systems with smaller volumes. It is important to note that the EEZ-ON® (soft-start) feature only works when switching the M35 Series valve on. The EEZ-ON® (soft-start) feature does not affect the exhaust (safety) function of the valve.

6.1.1. Safety Function According to ISO 13849 and EN 692

M35 Series valves are designed in accordance with the requirements listed in ISO 13849-1 and -2. Their “fail-to-safe” safety function is ensured even in case of a fault within the valve (e.g., caused by wear, contamination, or similar situations).

The safety function of the 3/2 M35 Series valve is to only supply compressed air (pneumatic energy) to the machine/system when the two valve elements are actuated simultaneously, but to shut-off the supply and to exhaust any downstream compressed air when both valves are shut off or if only one of the two valves is actuated. A fault in the system where only one valve actuates when switching on or only one de-actuates when switching off prevents air from being supplied downstream and simultaneously exhausts any air that is already downstream. Monitoring of the two pressure sensors by the user's external safety monitoring system makes it possible to detect these fault situations and to shut off and prevent further electrical energization of the solenoids.

The control outputs of the safety system must be designed and constructed to meet the Category and/or Performance Level requirements of the safety system, as determined by the risk assessment of the machine. Normally, the outputs to the solenoids is a dual-channel output from a safety relay or safety PLC.

These products are designed and manufactured in accordance with the safety principles of ISO 13849-1 and EN 692.

6.1.2. Common Cause Failure – CCF

Common Cause Failures (CCF) are failures of different components, resulting from a single event. CCF are not to be confused with cascading faults or common mode faults.

Common cause failures can cause loss of the safety function, especially in dual channel circuits where both channels could fail simultaneously due to a single event.

- Maintain compressed air quality, e.g., filtration, pressure regulation, lubrication.
- Avoid compressor oils that can cause valve seals to swell, soften, or otherwise deteriorate.
- Operate within prescribed temperature limits.
- Install the valve such that the normal stroke travel of the valve elements are perpendicular to the main direction of machine vibration and/or mechanical shock.
- Do not use a test pulse longer than allowed by the Technical Specifications.
- Avoid external magnetic fields.
- Do not plug the valve exhaust port.
- Use only high-flow, non-clogging silencers, available from ROSS®.

6.1.3. Diagnostic Coverage

A diagnostic coverage of 99% is achievable through appropriate integration of the M35 Series valve into the safety control system. The monitoring system must check for the proper change of state of each valve pressure sensor (S1 & S2) with each change of state of the safety control system outputs to the valve solenoids (Sol 1 & Sol 2). Detection of a fault by the safety control system must trigger a shut-off of the safety controller's outputs to the valve solenoids (Sol 1 & Sol 2), see section 8.

6.1.4. Fault Modes

Note that normal operation requires that Sol 1 & Sol 2 be energized simultaneously for switching the M35 Series valve on, and de-energizing both Sol 1 and Sol 2 simultaneously for switching the M35 Series valve off. Faults that could occur during normal operation:

Sol 1 & Sol 2 energized simultaneously

- S1 ON, S2 OFF
- S1 OFF, S2 ON
- S1 OFF, S2 OFF

Sol 1 & Sol 2 de-energized simultaneously

- S1 ON, S2 OFF
- S1 OFF, S2 ON
- S1 ON, S2 ON

6.1.5. Foreseeable Misuse

WARNING

Risk of Injury!

Misuse may result in injury or damage.

- The product must be used exclusively as intended.

Foreseeable misuse includes:

- Use outdoors
- Bypassing the safety function or diagnostics
- Failing to utilize the onboard pressure sensors to verify valve operation on every cycle – energizing and de-energizing
- Allowing continued operation of the valve when one or both valve shifted signals (from pressure sensors) are not confirmed.
- Use in reverse operation (reversal of supply and exhaust air)
- Operation in low-demand mode per IEC 61508
- Operating at pressures below minimum operating pressure or above maximum operating pressure.

6.2. Responsibilities of the System Owner

- Observe the information on assembly and operating conditions listed in the operating instructions or the data sheet.
- Comply with the further requirements of ISO 13849 (e. g., CCF, DC, PLr, software) if you intend to use the product in higher categories (2 to 4).
- Make sure that the maximum number of switching cycles (B_{10D}) within the service life T_M is not exceeded. If the expected number of switching cycles for a component exceeds the B_{10D} value during its period of use, suitable replacement intervals have to be specified.
- Switch the valve at least once a month to ensure its proper operation.
- Make sure that the fundamental and proven safety principles in accordance with ISO 13849 for implementation and operation of the component are complied with.
- Make sure that the permissible switch-on and switch-off pulses for feedback-free operation of the pneumatic devices are observed.
- If you operate the M35 Series valve together with an electric two-hand control, it must comply with the EN 574 standard. Selection and installation of this two-hand control must take place in accordance with the manufacturer's specifications.

6.3. Safety Instructions

- When implementing surge suppression measures, be sure to check whether or not this extends the valve shut off response time which could extend the machine stopping time.
- In case of high levels of machine vibration, use appropriate vibration-reducing elements when installing the valve.

- Supply the proper voltage as overvoltage situations can result in solenoid burnout.
- Make sure that the silencer's flow capacity is not restricted as this could affect system performance.
- If required, replace the silencer with high-flow, non-clogging silencers, available from ROSS®

7. Assembly and Installation

CAUTIONS

Risk of injury due to installation while pressurized or with live parts!

Installation while pressurized or with electrical power switched on can result in injuries due to sudden pressure build-up or electric shock.

- De-energize and de-pressurize the relevant system parts before installing the valves.
- Secure the system to prevent it being switched back on again.

ATTENTION

Destruction of components!

Chemical substances can damage the surface, the markings and the seals of the device.

- Install the valve such that it is protected against the effects of chemicals.

Damage to the device through storage at incorrect temperatures!

The storage temperature represents the permissible ambient temperature and depends on the type of valve in question.

- Observe the temperature information in chapter 10 "Technical Specifications."

7.1. Mechanical Installation

If attaching to an installed ROSS MD3™ or MD4™ Air Preparation Unit, use (2) ROSS connection clamps. If installing as a stand-alone unit, use either (2) ROSS connection clamp and bracket sets or install fittings directly into the inlet and outlet ports. Visit www.rosscontrols.com for more information.

7.2. Pneumatic Installation

Connect the compressed air supply to port 1. Connect port 2 to the downstream portion of the circuit.

7.3. Pneumatic and Electrical Connections

Electrical connections to the solenoids and sensors are made with male 5-pin M12 receptacles on the valve. See Pinouts on page 2. Female connectors and cables are sold separately. The cables and cable connections as well as the electrical control for the double valves must comply with the applicable safety regulations.

8. Commissioning and Operation

CAUTIONS

Damage to health due to loud noise!

Levels above 70 dB(A) may lead to damage to health!

- Always wear ear protectors when working on the product.

Before commissioning, the installation has to be carefully inspected by a qualified, trained professional.

Make sure that the technical specifications matches the operating criteria of the machine and/or the pneumatic system.

Always set the compressed air supply to a level that ensures that the minimum operating pressure is adhered to (see section 10 Technical Specifications).

8.1. Test Procedure

1. Only Solenoid A energized – Valve is faulted, supply is shut off, downstream air exhausts through port 3. Sensor A is off, sensor B is on.
2. Reset valve by de-energizing both solenoids – Valve is off, supply is shut off, and downstream air is exhausted through port 3. Sensors A & B are on.
3. Only Solenoid B energized – Valve is faulted, supply is shut off, downstream air exhausts through port 3. Sensor A is on, sensor B is off.
4. Reset valve by de-energizing both solenoids – Valve is off, supply is shut off, and downstream air is exhausted through port 3. Sensors A & B are on.
5. Solenoids A & B energized
Valve is on, air pressure is supplied downstream through port 2 and port 3 is shut off. Sensors A & B are off.
6. Solenoids A & B de-energized – Valve is off, supply is shut off, and downstream air is exhausted through port 3. Sensors A & B are on.

NOTE: Test 1 & 3 can only be conducted for solenoid configuration "A" (M35***AEXA**A).

Results from the test procedure other than those listed above could indicate a valve malfunction. See section 5, Service, Repair, and Maintenance.

Failure of the valve to shift synchronously leads to a fault in the M35 Series valve.

This could happen for a variety of reasons, such as:

- Defective piston seals,
- Main valve elements experiencing a switching delay due to dirt or resinous oil,
- Insufficient electrical signals to valve solenoids; suitable voltage not available,
- Receipt of signals at solenoids not synchronous,
- Pilot valves experiencing a switching delay due to damaged components, dirt, or resinous oil,
- Excessive water build-up in the valve.

9. Disconnecting and Removal



CAUTIONS

Risk of injury due to installation while pressurized or with live parts!

Installation while pressurized or with electrical power switched on can result in injuries due to sudden pressure build-up or electric shock.

- ▶ De-energize and de-pressurize the relevant system parts before installing the valves.
- ▶ Secure the system to prevent it being switched back on again.

Risk of injury due to disconnecting pressurized or live parts.

- Disconnecting a pneumatic component while the system is pressurized or while electrical power is supplied can result in injury or death due to sudden pressure release, unexpected movement, or electric shock.
- Isolate and lock out the electrical and pneumatic systems before disconnecting the valves.

10. Technical Specifications

Design: Redundant, 3/2 Normally Closed, Dual Poppet.

Actuation: Solenoid pilot operated with air assisted spring return. One solenoid per valve element (2 total) – both to be operated synchronously.

Shock test (based on DIN EN 60068-2-27):

- Acceleration: 30G.
- Shock duration: 16ms.
- Shock waveform: 1/2-sine.
- Vibration test: (based on DIN EN 60068-2-6): Acceleration: 10.g.
- Frequency Acceleration: 55Hz - 82,2Hz
- Amplitude: 0,75mm peak to peak.

Mounting Type: In-line mounted - modular/threaded.

Mounting Orientation: Any, preferably vertical.

Flow Media: Compressed air according to ISO 8573-1 Class 7:4:4.

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

Ambient Temperature: 40° to 122°F (4° to 50°C).

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

Standard Voltages: 24 volts DC.

Pilot Solenoids: According to VDE 0580. Rated for continuous duty.

Electrical connection type 5-pin M12. Enclosure rating according to DIN 400 50 IP 65.

Pilot Solenoids Power Consumption (each solenoid): 1.2 watts.

Enclosure Rating: According to DIN 400 50 IP 65.

Electrical Connections: Two 5-pin M12 connectors. Enclosure rating according to DIN 400 50 IP 65.

Pressure Sensors (2 per valve): PNP solid state.

Pressure Sensors Current Consumption (each sensor): <23mA (each without contacts).

Pressure Sensors: $B_{10D} = 200 \times 10^6$.

B_{10D} Value according to ISO 13849-1 and -2: Service life parameter measured according to ROSS Engineering Standard, Laboratory Test Procedures Section 8:

$B_{10D} = 20$ million cycles.

Maximum Cycle Rate: 5 Hz, measured without volume. The switching frequency decreases depending on the volume to be controlled.

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.

Sound Pressure Level [dB(A)]: Consult ROSS for value, maximum pulse sound pressure level at the loudest measuring point when exhausting the valve with a ROSS Controls silencer. The sound pressure level is influenced by the individual systems used for reduction of noise emissions. Do not restrict the valve exhaust. Use of the product without the silencer is not recommended.

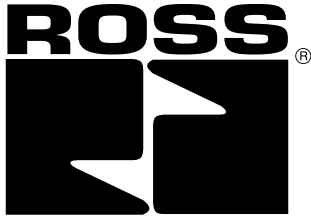
Minimum Operation Frequency: Once per month, to ensure proper function.

Maximum Recommended Allowable Discordance Time: 150 msec.

11. Disposal

Dispose of the valve in accordance with the applicable statutory regulations in your country.





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AN INDEPENDENT REPRESENTATIVE

STANDARD WARRANTY

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

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