NEW

# PRODUCT DATA SHEET INFORMATION

# M35 Series Control Reliable Double Valves

## Safety Exhaust (Dump) Double Valve with or without EEZ-ON® (Soft Start) Module

## Designed for External Monitoring

### Port Size 1/2 & 3/4

up to CAT 4, PL e (certification pending)

*Model without EEZ-ON® (Soft Start)*

*Model with EEZ-ON® (Soft Start)*

**FEATURES & BENEFITS:**

- Proven ROSS SERPAR® Crossflow technology - control-reliable, Category 4, PL e applications, shuts-off and exhausts even when faulted
- Pressure sensors - allow for external monitoring of valve state
- Modular or threaded port connection - allows modular connection to air entry system (Lockout Valve, Filter, Regulator, Lubricator)
- Integrated EEZ-ON® (soft start) module option - allows slower build-up of pressure during start-up (does not increase width of unit)
- LED indicators - aid troubleshooting (power on main solenoids, feedback pressure sensors, and fault/no fault condition)
- Includes high-flow, clog-resistant silencer - reduces actuation/de-actuation noise and no back pressure from clogging
- 3/2 Normally Closed function - shuts off pneumatic energy supply and exhausts (dumps) downstream pressure

## HOW TO ORDER

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

| M35 | S | 40 | G | A | E | X | AA | G | A |
|---|---|---|---|---|---|---|---|---|---|
| Series | Soft Start Function | Port Size | Thread | Voltage | Monitoring | Communication | Pin Configuration Combinations* | Pressure Gauge | Revision Level |

**Soft Start Function**

| | |
|---|---|
| With Soft Start | S |
| No Soft Start | X |

**Port Size**

| Inlet | Outlet | |
|---|---|---|
| 1/2 | 1/2 | 40 |
| 3/4 | 3/4 | 50 |

**Thread**

| | |
|---|---|
| BSPP | G |
| NPT | N |

**Voltage**

| | |
|---|---|
| 24 volts DC | A |

**Monitoring**

| | |
|---|---|
| External | E |

**Communication**

| | |
|---|---|
| None | X |

**Pin Configuration Combinations***

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

*Pinouts details, see page 3.

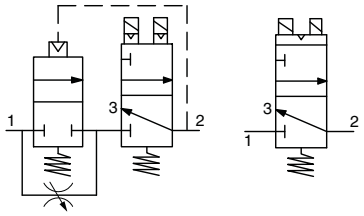
**Pressure Gauge**

| | |
|---|---|
| With Gauge | G |
| No Gauge | X |

**Revision Level**

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

**Simplified Schematics**




With Soft Start module

Without Soft Start module

| Port Size | Basic Size | Soft Start | $C_V$ 1-2 | $C_V$ 2-3 | Weight lb (Kg) |
|---|---|---|---|---|---|
| 1/2 | 8 | With | 4.1 | 7.5 | 6.5 (2.9) |
| 1/2 | 8 | Without | 4.3 | 7.5 | 4.2 (1.9) |
| 3/4 | 8 | With | 4.1 | 7.5 | 6.5 (2.9) |
| 3/4 | 8 | Without | 4.3 | 7.5 | 4.2 (1.9) |

## Standard 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.
**Mounting Type:** Inline 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 120°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.
**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).
**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.

***Pending*** **Functional Safety Data:** Category 4 PL e; B10D: 20,000,000; PFHD: $7.71 \times 10^{-9}$ ; MTTFD: 301.9 ($n_{op}$: 662400).
**Certifications**: CE Marked for applicable directives, DGUV Test, CSA/UL, TSSA for appropriately tested valves.
**Vibration/Impact Resistance:** Tested to BS EN 60068-2-27.

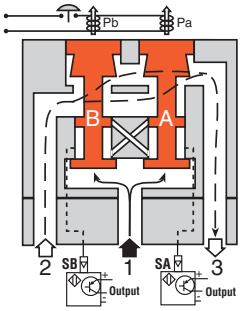
***This valve is not designed for controlling clutch/brake mechanisms on mechanical power presses, see DM2® Series D double valves for mechanical power press applications.***

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 that the M35 Series valve cannot exhaust pneumatic energy from downstream of obstructions such as check valves and closed center function valves.*

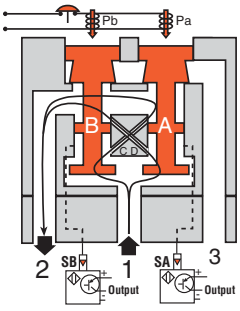
The M35 Series valves are designed for external monitoring for safe, redundant operation of the valves. The M35 Series valves are constructed of redundant, 3/2 poppet type valves, and have an overall function of a single solenoid pilot-operated, spring return valve. Each single valve in the M35 Series valve is equipped with a solid state pressure sensor. Monitoring both of these sensors on each actuation and de-actuation of the M35 valve provides a diagnostic coverage of 99%. Monitoring of these sensors is to be done by an external monitoring system.

The function of the optional 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, and to gradually refill the system.

## VALVE OPERATION



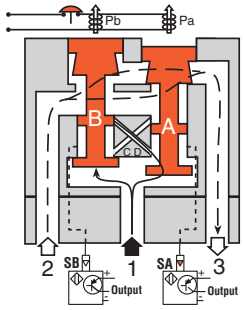

**Conditions at Start:**
Inlet 1 is closed to outlet 2 by both valve elements A and B. Outlet 2 is open to exhaust 3. Pressure signals at both sensors SA and SB are exhausted. Sensors outputs SA and SB are ON.




**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.

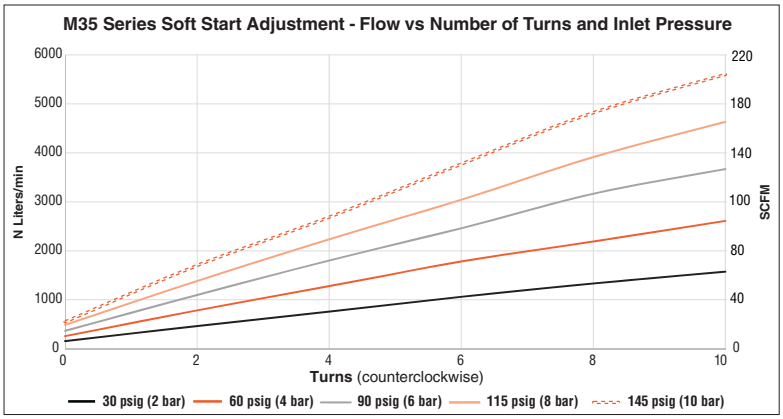
**Completion of Normal Cycle:**
Simultaneously de-energizing both solenoids returns the valve to the "Conditions at Start" described at left.

**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.

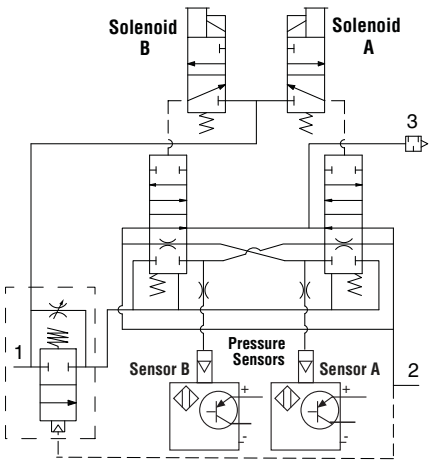



**Exhaust Time – Normal and Faulted Conditions (s)**

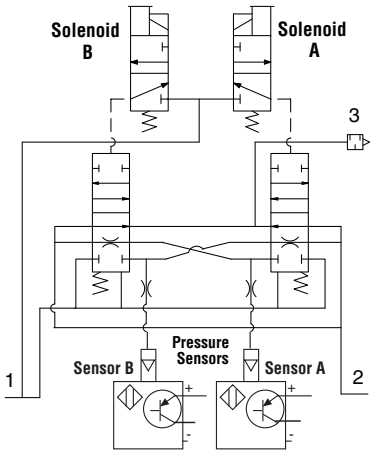
| Volume ft³ (L) | Normal or Faulted | Operating Pressure | | | | | |
|---|---|---|---|---|---|---|---|
| | | 30 psig (2 bar) | | 90 psig (6 bar) | | 145 psig (10 bar) | |
| | | to 15 psig (1 bar) | to 7 psig (0.5 bar) | to 15 psig (1 bar) | to 7 psig (0.5 bar) | to 15 psig (1 bar) | to 7 psig (0.5 bar) |
| 0.071 (2) | N | 0.055 | 0.071 | 0.094 | 0.112 | 0.120 | 0.135 |
| | F | 0.072 | 0.098 | 0.147 | 0.183 | 0.200 | 0.247 |
| 0.35 (10) | N | 0.131 | 0.208 | 0.317 | 0.393 | 0.424 | 0.507 |
| | F | 0.185 | 0.301 | 0.533 | 0.710 | 0.789 | 1.024 |
| 0.71 (20) | N | 0.226 | 0.379 | 0.597 | 0.746 | 0.804 | 0.971 |
| | F | 0.326 | 0.555 | 1.016 | 1.368 | 1.526 | 1.997 |
| 1.41 (40) | N | 0.416 | 0.721 | 1.155 | 1.451 | 1.564 | 1.899 |
| | F | 0.608 | 1.063 | 1.983 | 2.685 | 3.000 | 3.941 |
| 5.30 (150) | N | 1.462 | 2.604 | 4.227 | 5.326 | 5.743 | 7.006 |
| | F | 2.160 | 3.855 | 7.298 | 9.929 | 11.107 | 14.635 |




**With optional EEZ-ON® (soft start) module**

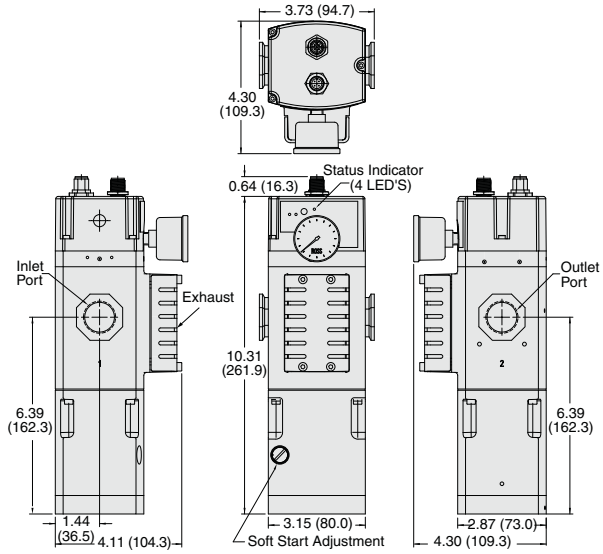



**Without EEZ-ON® (soft start) module**

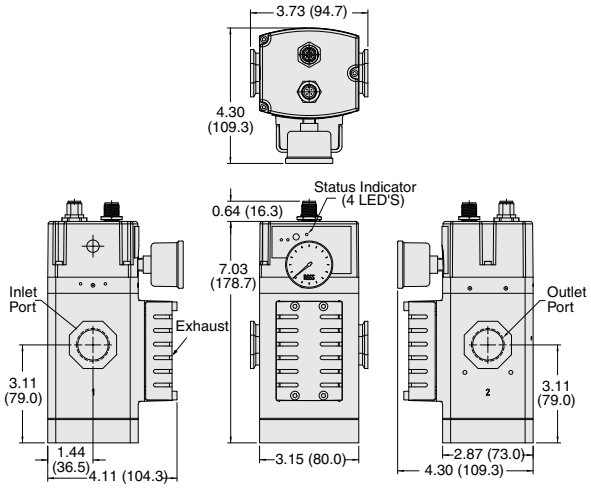


**With optional EEZ-ON® (soft start) module**

**Valve Dimensions** – inches (mm)



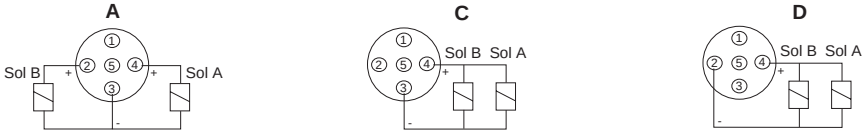

**Without EEZ-ON® (soft start) module**



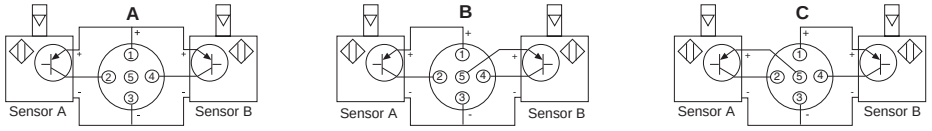

**Solenoids & Pressure Sensors Pinouts**

| Pin Configuration Combinations | | |
|---|---|---|
| Solenoid | Sensor | |
| A | A | AA |
| A | B | AB |
| A | C | AC |
| C | C | CC |
| D | B | DB |
| D | C | DC |

**Solenoids**




**Pressure Sensors**




**An Integration Guide for M35 Series valves is available from ROSS to provide information such as operation, monitoring, and integration into users control circuits, please folow link to access the M35 Series valves Integration Guide**

# Air Entry Assemblies with Control Reliable Energy Isolation

- Pre-engineered panel mountable design with manual Lockout L-O-X® valve, air entry via a filter and regulator "FR", or filter, regulator and lubricator "FRL", and M35 Series Double Valve with or without Soft Start function
- Applications include Pneumatic Control and Air Dump/Release

**Pneumatic Energy Isolation (LOTO)** (certification pending)

CONTROL CATEGORY 4

## HOW TO ORDER

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

| M35 | S | L | R | 2U | 40 | G | A | E | X | AA | G | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Series | | | | | | | | | | | | |

**M35 Valve**

| | |
|---|---|
| With Soft Start | S |
| No Soft Start | X |

**Lockout Valve Type***

| | |
|---|---|
| L-O-X® | L |
| Modular L-O-X® | M |
| No L-O-X® | X |

* Silencer included.

**Filter, Regulator, Lubricator**

| | |
|---|---|
| Integrated Filter/Regulator | F |
| **Filter and Regulator** | **R** |
| Filter, Regulator,and Lubricator | L |
| No Filter, Regulator, or Lubricator | X |

**Extra Port** (in relation to M35 valve)

| Location | Size | Code | Location | Size | Code |
|---|---|---|---|---|---|
| **Upstream** | **1/4** | **2U** | Downstream | 1/2 | 4D |
| Upstream | 3/8 | 3U | Both | 1/4 | 2B |
| Upstream | 1/2 | 4U | Both | 3/8 | 3B |
| Downstream | 1/4 | 2D | Both | 1/2 | 4B |
| Downstream | 3/8 | 3D | None | NA | XX |

**Port Size**

| Inlet | Outlet | |
|---|---|---|
| 1/2 | 1/2 | 40 |
| 3/4 | 3/4 | 50 |

**Thread**

| | |
|---|---|
| BSPP | G |
| NPT | N |

**Voltage**

| | |
|---|---|
| 24 volts DC | A |

**Monitoring**

| | |
|---|---|
| External | E |

**Communication**

| | |
|---|---|
| None | X |

**Revision Level**

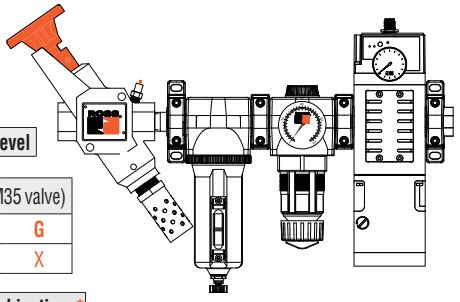
**Pressure Gauge** (for M35 valve)

| | |
|---|---|
| With Gauge | G |
| No Gauge | X |

**Pin Configuration Combinations***

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

*Pinouts details, see page 3.



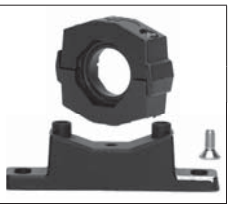
***These systems are not designed for controlling clutch/brake mechanisms on mechanical power presses.***

# Mounting Accessories

*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

| Description | Model Number |
|---|---|
| Bracket and Screw | R-A118-103 |
| Clamp | R-A118-105 |
| Bracket, screw, and Clamp | R-A118-105M |



## Extra Port Blocks

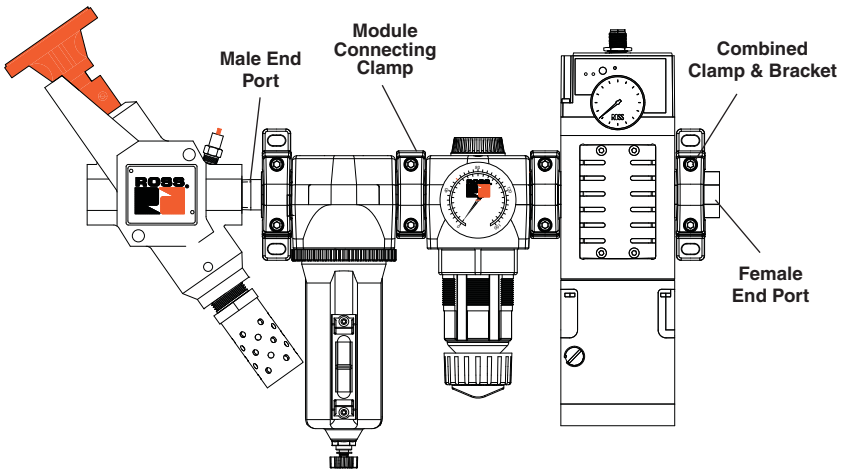
| Port Size | Model Number | |
|---|---|---|
| | NPT Threads | BSPP Threads |
| 1/2 | R-118-106-4 | R-118-106-4W |

## Female End Ports

| Port Size | Model Number | |
|---|---|---|
| | NPT Threads | BSPP Threads |
| 1/2 | R-118-100-4 | R-118-100-4W |
| 3/4 | R-118-100-6 | R-118-100-6W |

## Male End Ports

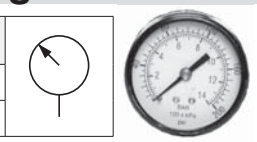
| Port Size | Model Number | |
|---|---|---|
| | NPT Threads | BSPP Threads |
| 1/2 | R-118-109-4F | R-118-109-4FW |
| 3/4 | R-118-109-6F | R-118-109-6FW |




# Pressure Gauge

| Port Size | Model Number* | Pressure Range psig (bar) | Case Diameter inches (mm) |
|---|---|---|---|
| 1/8 | 5400A1002 | 0-160 (0-11) | 1.5 (38) |

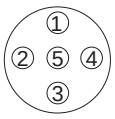
* Center back mounting; male pipe threads.



# Wiring Kits

| Wiring Kit | Description | Kit Number | Number of Cables | Cord Length meters (feet) |
|---|---|---|---|---|
| M12 System Cables Connector - one end | Cords with female, 5-pin, straight, A-coded connector on one end and flying leads on the opposite end. | 2644B77 | 2 | 5 (16.4) |
| M12 System Cables Connector - both ends | Cords with female, 5-pin, straight, A-coded connector on one end and male, 5-pin, straight, A-coded connector on the opposite end. | 2645B77 | 2 | 5 (16.4) |

**Wire Colors**




1 Brown
2 White
3 Blue
4 Black
5 Grey

**FLUID POWER PRODUCTS FOR PNEUMATIC SOLUTIONS:**

- **Base Mounted Valves and Sub-Bases**
- **Line Mounted Valves**
- **Manual & Mechanical Valves**
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- **Press Safety Products**
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- **ROSS Integrated Systems**

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Standard ROSS warranty, cautions and warnings apply, available upon request or at www.rosscontrols.com.

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