

Model AMD-3 Automatic Nitrogen Maintenance Device High Pressure (Cylinder) Reducing Type with Field-Adjustable Pressure Regulator

General Description

The TYCO Model AMD-3 Automatic Nitrogen Maintenance Device is an automatic, field-adjustable, nitrogen maintenance device of the high pressure reducing type. The Model AMD-3 Device is utilized in conjunction with a cylinder of high pressure to control the pressure in a dry pipe sprinkler system, preaction system, or dry pilot line system of a dry pilot actuated deluge or preaction valve.

The Model AMD-3 Device features a two-stage pressure regulator that maintains a constant outlet pressure, as the cylinder pressure decreases to the set point.

Use of the Model AMD-3 Device is typically specified in applications for which a dependable plant or local air supply is not available; the system piping requires pneumatic pressure having a maximum dewpoint as shown in Figure 2; or, the presence of potentially explosive vapors prohibits the installation of an automatic air compressor.

The Model AMD-3 Device is a re-designation for the Gem Model F328.

NOTICE

The Model AMD-3 Automatic Nitrogen Maintenance Devices described herein must be installed and maintained in compliance with this document and with the applicable standards of the National Fire Protection Association, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

Owners are responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

Technical Data

Approvals
UL and C-UL Listed
FM Approved
NYC Approved under MEA 206-02-E

Maximum Inlet Nitrogen Supply Pressure
3000 psi (200 bar)

Field-Adjustable Outlet Pressure Range
4 to 60 psi (0,4 to 4,1 bar)

Inlet Gauge Range
200 to 4000 psi (1000 to 28000 kPa)

Outlet Gauge Range
4 to 100 psi (30 to 700 kPa)

Cylinder Outlet Connection
C.G.A. No. 580

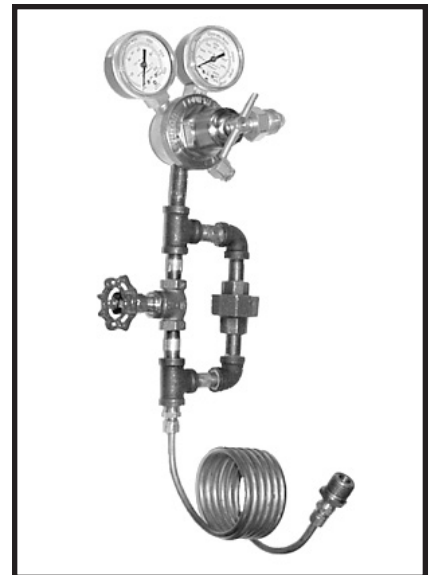
Assembly
Major components illustrated in Figure 1 are factory-assembled, galvanized steel nipples and malleable iron pipe fittings. Connection to the system is via copper tubing and brass tubing fittings.

Design Criteria

Unless otherwise specified, nitrogen cylinders with Outlet Connection No. 580 are supplied with nitrogen having a dewpoint equal to or less than -60° F (-51°C) at atmospheric pressure. Figure 2 illustrates the maximum dew-point of the supply nitrogen as a function of the system pressure.

The approximate volume "N" of free nitrogen (that is, at atmospheric pressure) in cubic feet, required to fill a system having a capacity of "V" in U.S. gallons, to a pressure "P" in pounds per square inch gauge, can be determined using the formula:

$$N=0.009VP$$



A typical cylinder volume is 242 cubic feet of free nitrogen, but the actual figure varies depending on the supplier.

The approximate time "T" in minutes to fill a system having a capacity of "V" in U.S. gallons, as a function of system pressure, can be determined using the formula:

$$T=CV$$

where "C" is a constant determined from the following table:

System Pressure PSI	"C"
20	0.0400
30	0.0424
40	0.0440
50	0.0451
60	0.0457

Operation

The By-Pass Valve in the Model AMD-3 Automatic Nitrogen Maintenance Device is opened to quickly fill the system during initial pressurization. After the required system pressure is reached, the By-Pass Valve is closed and the Cylinder Control Valve is left open to place the Model AMD-3 Device in automatic operation.

Given a small leak in the system, the Pressure Regulator will automatically maintain system pressure at the pre-set level. The 3/32 inch (2,4 mm) orifice in the Restrictor Check Valve limits the flow of nitrogen from the Pressure Regulator into the system to a value significantly less than that exhausted by the operation of a 5.6 K-factor sprinkler.

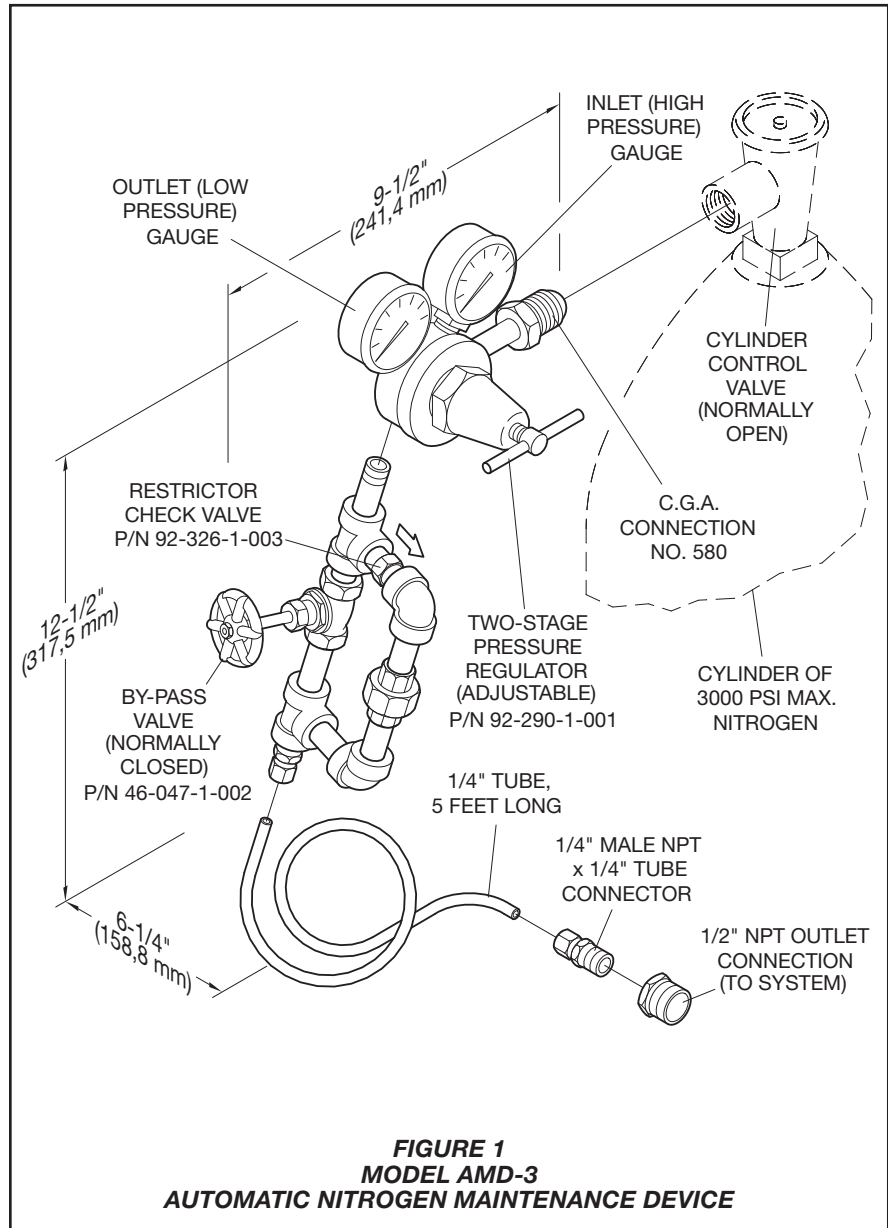
Installation

The TYCO Model AMD-3 Automatic Nitrogen Maintenance Device must be installed in accordance with the following instructions.

1. Assemble the Model AMD-3 Device components as shown in Figure 1. Apply pipe-thread sealant sparingly to male pipe threads only.
2. Make connections a minimum of 1/2 (DN15) pipe size between the Model AMD-3 Device and the system.
3. Place a 1/2 inch (DN15), non-spring loaded, rubber-faced, swing-type check valve (such as P/N 46-049-1-004) between the Model AMD-3 Device and the system to pressurize. A check valve of this type is typically provided in the air supply trim of TYCO dry pipe valves, preaction valves, and dry pilot trim.
4. Install a minimum 1/4 inch size pressure relief valve (such as P/N 92-343-1020) between the Model AMD-3 Device and the system piping. A relief valve of this type is typically provided in the air supply trim of TYCO dry pipe valves, preaction valves, and dry pilot trim.
5. Following the steps outlined in the caution below, install the nitrogen cylinder.

CAUTION

- a. The following instructions regarding the nitrogen cylinder must be strictly followed. Failure to do so may result in personal injury or property damage.
- b. Secure the cylinder to a wall or post, ensuring it will not tip or fall if accidentally bumped.



c. Inspect the Cylinder Control Valve outlet for dirt, dust, damaged threads, oil, or grease. Remove dirt and dust with a clean cloth. If damaged threads, oil, or grease are present, replace the cylinder.

d. Inspect the Pressure Regulator inlet for dirt, dust, damaged threads, oil, or grease. Remove dirt and dust with a clean cloth. If damaged threads, oil, or grease are present, have the Pressure Regulator serviced by an authorized agent of the Victor Equipment Company.

e. With the cylinder securely in place and while standing to the side or rear of the Cylinder Control Valve, momentarily crack open the Cylinder Control Valve. This procedure is intended to blow out any foreign matter that may be inside the valve outlet.

f. Attach the Model AMD-3 Device to the Cylinder Control Valve and securely wrench-tighten.

Operating Procedure

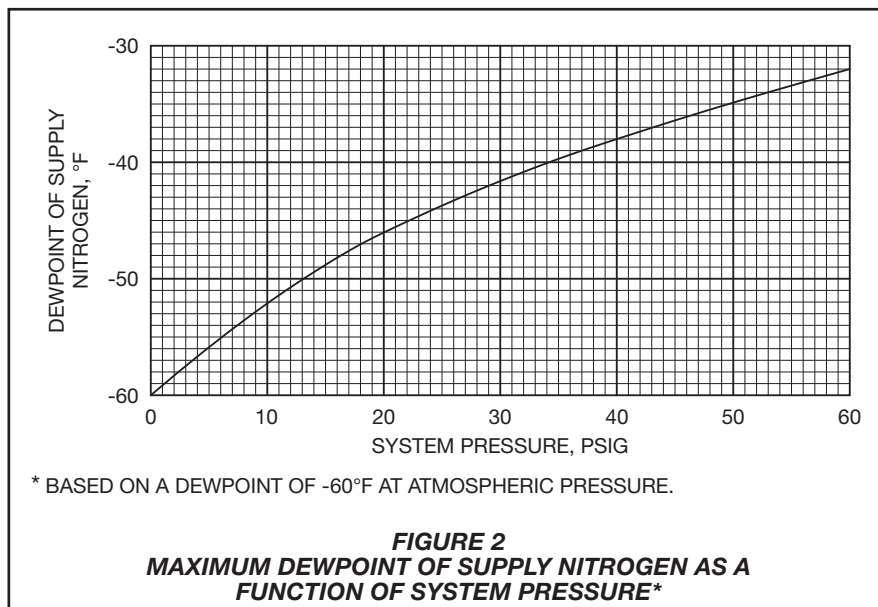
Place the TYCO Model AMD-3 Automatic Nitrogen Maintenance Device in operation in accordance with the following procedure.

1. Determine the pressure that meets the minimum requirements of the system to pressurize.
2. Close the control valve in the air supply trim to the system.
3. Turn the Two-Stage Pressure Regulator adjusting handle counterclockwise until the adjusting spring pressure is fully released.
4. Standing to the side of the nitrogen cylinder opposite from the Pressure Regulator, slowly crack open the Cylinder Control Valve until the cylinder pressure is indicated on the High Pressure Gauge and then fully open the Cylinder Control Valve to seal its packing.
5. Slowly turn the Two-Stage Pressure Regulator handle clockwise until the Outlet Pressure Gauge indicates the required pressure established in Step 1.
6. Open the By-Pass Valve in the Model AMD-3 Device.
7. Open the control valve in the air supply trim to the system.
8. After the system pressure stabilizes, note the value on the system pressure gauge and compare it with the requirement. Adjust the Pressure Regulator, as required (counterclockwise to decrease and clockwise to increase). One-half turn of the stem changes the outlet pressure by approximately 8 psi.
9. If the system pressure must be decreased, first re-adjust the Pressure Regulator, then momentarily open a connection to the system to reduce the pressure to below the required value. Allow the system pressure to automatically stabilize.
10. Close the By-Pass Valve in the Model AMD-3 Device.

NOTICE

Following a sprinkler operation, in order to prevent a delay in the release of the automatic control valve, the By-Pass Valve must be closed when the fire protection system is in service.

11. Check all supply pressure connections for leaks.



Care and Maintenance

The TYCO Model AMD-3 Automatic Nitrogen Maintenance Device must be maintained and serviced in accordance with the following instructions, in addition to any specific requirements of the NFPA. Any impairment must be immediately corrected.

NOTICE

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection system from the proper authorities and notify all personnel who may be affected by this action.

It is recommended that a spare supply of nitrogen be kept on hand.

Make no attempt to field-repair or replace any component of the Pressure Regulator.

Inspections should be made more frequently, after the system is initially placed in service, to develop a guideline as to the required schedule for nitrogen cylinder replacement. Graphing the Inlet Gauge pressure noted during each inspection will assist in this evaluation.

After placing a fire protection system in service, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

Responsibility lies with sprinkler owners for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (for example, NFPA 25), in addition to the standards of any authorities having jurisdiction. Contact the installing contractor or sprinkler manufacturer regarding any questions.

Automatic sprinkler systems should be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national code.

INSPECTION PROCEDURE

The Model AMD-3 Automatic Nitrogen Maintenance Device must be inspected quarterly in accordance with the following instructions.

1. Verify that the control valve in the air supply trim to the system is open.
2. Verify that the nitrogen Cylinder Control Valve is open.
3. Verify that the By-Pass Valve is closed.

NOTICE

Following a sprinkler operation, in order to prevent a delay in the release of the automatic control valve, the By-Pass Valve must be closed when the fire protection system is in service.

4. Verify that the system pressure gauge indicates the same value as the previously established requirement. If not, re-adjust per Step 8 of the Operating Procedure section.

5. Verify that the Inlet Pressure Gauge of the Pressure Regulator indicates sufficient nitrogen cylinder pressure. It is recommended that the nitrogen cylinder be replaced whenever its pressure falls to 200 psi or below.

NITROGEN CYLINDER REPLACEMENT PROCEDURE

Replace the nitrogen cylinder in accordance with the following instructions.

1. Close the control valve in the air supply trim to the system.
2. Close the Cylinder Control Valve.
3. Remove the Model AMD-3 Device from the Cylinder Control Valve by slowly unscrewing the inlet connection to the Pressure Regulator.
4. Following the steps outlined in the caution below, replace the nitrogen cylinder.

CAUTION

The following instructions with regard to the nitrogen cylinder must be strictly followed. Failure to do so may result in personal injury or property damage.

- a. *Secure the cylinder to a wall or post, ensuring that it will not tip or fall if accidentally bumped.*
 - b. *Inspect the Cylinder Control Valve outlet for dirt, dust, damaged threads, oil, or grease. Remove dirt and dust with a clean cloth. If damaged threads, oil, or grease are present, replace the cylinder.*
 - c. *Inspect the Pressure Regulator inlet for dirt, dust, damaged threads, oil, or grease. Remove dirt and dust with a clean cloth. If damaged threads, oil, or grease are present, have the pressure regulator serviced by an authorized agent of the Victor Equipment Company.*
 - d. *With the cylinder securely in place and while standing to the side or rear of the Cylinder Control Valve, momentarily crack open the Cylinder Control Valve. This procedure is intended to blow out any foreign matter that may be inside the valve outlet.*
 - e. *Attach the Model AMD-3 Device to the Cylinder Control Valve and securely wrench-tighten.*
5. Open the Cylinder Control Valve in accordance with Step 4 in the Operating Procedure section.
 6. Open the control valve in the air supply trim to the system.
 7. Check the Pressure Regulator connection for leaks.

Limited Warranty

Products manufactured by Tyco Fire Suppression & Building Products (TFSBP) are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by TFSBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFSBP or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any authorities having jurisdiction. Materials found by TFSBP to be defective shall be either repaired or replaced, at TFSBP's sole option. TFSBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFSBP shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

In no event shall TFSBP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, indirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFSBP was informed about the possibility of such damages, and in no event shall TFSBP's liability exceed an amount equal to the sales price.

The foregoing warranty is made in lieu of any and all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name, including description and Part Number (P/N).

Model AMD-3 Device

Specify: Model AMD-3 Automatic Nitrogen Maintenance Device, P/N 52-328-2-001.

Replacement Parts

Specify: (description) for use with the Model AMD-3 Automatic Nitrogen Maintenance Device, P/N (from Figure 1).