MATHESON
The Gas Professionals

Manual Control Valves

Operation Instructions

READ AND COMPLY WITH THESE INSTRUCTIONS BEFORE INSTALLING, OPERATING, OR SERVICING

INT-0070 Rev C

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I. SERVICE

General Service

A unit which is not functioning in a normal manner should be removed from service until such time that repairs or replacement can be made. Upon completion of repair, full testing should be performed to assure the user that the unit has been returned to its original operating parameters. MATHESON can repair or replace equipment. To arrange for repair or replacement service, call 1-800-828-4313 and ask for the Warranty Administrator. **No product will be received by MATHESON without indication of gas service and without proper return material authorization provided by the warranty administrator. (All repairs must be made by MATHESON or an assigned and approved facility to maintain any warranties or guarantees).**

If the unit is under an applicable warranty, return the unit to MATHESON for repair or replacement. To arrange for warranty service, call 1-800-828-4313 and ask for the Warranty Administrator. **No product will be received by MATHESON without indication of gas service and without proper return material authorization provided by the warranty administrator.**

If advised by the Warranty Administrator to return the product to MATHESON, prepare the product for shipment and write, in large lettering the RMA Number assigned by the Warranty Administrator on the outside of the box. Also, if required by the Warranty Administrator, supply the completed RMA form with the product. Make sure that the product is adequately packaged, in the original shipping container if possible, and shipped prepaid (MATHESON will not accept COD freight) with a description of the observed deficiency to the attention of the:

Warranty Administrator
MATHESON
166 Keystone Drive
Montgomeryville, PA 18936

The user is expected to periodically inspect the product for leaks, loose or worn parts, broken or non-functioning components and to address those situations immediately. If the user would require verbal assistance in ascertaining the potential of a problem with any MATHESON product, contact the local MATHESON branch for assistance or your MATHESON Sales Representative.

II. TROUBLE SHOOTING

Indications of Manual Control and Lecture Bottle Control Malfunction

1. Gauges (if supplied) should always read zero when all gas is drained from the manual control. If they do not read zero they may have to be replaced.

2. No gas should be coming out of the outlet when the manual control or lecture bottle control is in the closed position. If there is gas flow, this is an indication of seat failure or imminent seat failure.

3. Gas leakage should never occur from the bonnet (end of the control with adjusting knob protruding). If there is gas leakage, it is possible that the seal is deficient.

4. All joints and connections on a manual control or lecture bottle control should be periodically checked for leaks. Presence of leaking seals is indicative of deficient performance.

If any of the above noted deficiencies are observed by the user, the unit should immediately be removed from service and arrangements made for repair or replacement of the deficient product.

WARNING: Manual controls and lecture bottle controls do not control flow or pressure accurately. These units are intended for dispensing gases on a short term basis to open ended systems, where there is no chance for the system to be dead ended or develop a back pressure. These units are not intended to throttle or control pressure or flow in any way whatsoever.

III. LIMITED WARRANTY

This equipment is sold by MATHESON under the warranties set forth in the following paragraphs. Such warranties are extended only with respect to the purchase of this equipment directly from MATHESON or MATHESON's Authorized Agent as new merchandise and are extended to the first Buyer thereof other for than the purpose of resale.

For a period of one year from date of original delivery (ninety days in corrosive service) to Buyer or to Buyer's order, this equipment, is warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts, provided that this equipment is properly operated under the conditions of normal use and that regular and periodic maintenance and service is performed or replacements are made in accordance with the instructions provided. Expendable parts of this equipment are similarly warranted to be free from functional defects in materials and workmanship and to conform to the description of this equipment contained in this manual and any accompanying labels and/or inserts. The foregoing warranties shall not apply if the equipment has been repaired other than by MATHESON or a service facility designated by MATHESON, or if this equipment has not been operated and maintained in accordance with written instructions provided by MATHESON, or has been altered by anyone other than MATHESON, or if the equipment has been subject to abuse, misuse, negligence or accident.

MATHESON's sole and exclusive obligation and the Buyer's sole and exclusive remedy under the above warranties is limited to repairing or replacing, free of charge, at MATHESON's sole discretion, the equipment or part which is telephonically reported to be a problem to the local MATHESON Branch Location, and which if so advised, is returned with a written statement of the observed deficiency, not later than seven days after the expiration of the applicable warranty, to the MATHESON Gas Equipment Technology Center during normal business hours, transportation charges prepaid, and which, upon examination, is found to comply with the above warranties. The Buyer shall pay for return trip transportation charges for the equipment or part.

MATHESON shall not be otherwise liable for any damages including but not limited to incidental damages, consequential damages, or special damages, whether such damages result from negligence, breach of warranty or otherwise.

There are no express or implied warranties that extend beyond the warranties hereinabove set forth. MATHESON makes no warranty of merchantability or fitness for a particular purpose with respect to the equipment or parts thereof.

Acceptance of the equipment by the final buyer indicates the final buyer's acceptance of all warranties and limitations set forth above.

IV. USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically, with the frequency of such inspections depending upon the scope of use. Damaged, worn or contaminated equipment should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, MATHESON recommends that a telephonic or written request for service advice be made to the MATHESON Equipment Engineering Group in Montgomeryville Pennsylvania or to the nearest MATHESON branch location.

This equipment or any of its parts should not be altered without the prior written approval of MATHESON Equipment Engineering Group. The user of this equipment shall have the sole responsibility for any malfunction, which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than MATHESON or a service facility designated by MATHESON. Further, the ultimate user of the equipment is responsible for the training and safe operation of the equipment by personnel in his/her employ.

V. SAFETY PRECAUTIONS

1. Many Specialty Gases are hazardous in nature. It is important that the user of the equipment carefully review the hazards associated with the gas to be used with the regulator. **Before installing the manual control or lecture bottle control on any cylinder of compressed or liquefied gas, refer to the MSDS that was shipped with the gas, or on file in your facility, as to the specific hazards associated with the gas to be used. Also, refer to all applicable inserts contained with the equipment for additional precautions and operating instructions.**

2. Before using any manual control or lecture bottle control on toxic, corrosive, pyrophoric, flammable or other type of hazardous gas, test the leak integrity of the control using an inert gas.

3. Manual controls and lecture bottle controls do not control flow or pressure to any degree of accuracy. Manual controls and lecture bottle controls are for short duration dispensing of gases into an open ended system. **Never use manual controls or lecture bottle controls in a system that can be dead ended or a system that will develop any back pressure.** Make certain that the materials in the control are compatible with the service intended.

4. Make certain that the manual control or lecture bottle control purchased is suitable for the application intended. All products supplied by MATHESON have a serial number, a model number, and a pressure limitation label and/or stamping. Carefully review this information to establish the unit fit for service in the desired application.

5. Make certain that the equipment purchased or delivered to the ultimate end user conforms to the specifications of the user. The user is responsible for selecting equipment compatible with gases that are to be used, physical parameters of operation and performance and normal material compatibilities. Selection information can be found in MATHESON Catalogs, MATHESON Tech Briefs and in the MATHESON Gas Data Book. In addition, any MATHESON representative would be pleased to aid in the selection of specific equipment.

6. Before installation of the manual control or lecture bottle control onto any cylinder of compressed or liquefied gas, carefully inspect the unit for visible signs of damage or contamination. Close attention should involve visual inspection of all exposed and connecting threads for visible signs of wear and abuse. Also examine the unit for any loose parts outside of those that must swivel for connection to the gas cylinder or outlet lines. Also examine the unit for signs of contamination with dirt, grease or any other foreign material. Close attention should be given to the external appearance and the view of the unit from the inlet and the outlet. If any foreign materials are present and cannot be removed from the unit easily with a cloth, or if the threads on the unit appear to be abused as indicated above, or any of the components appear to be loose, return the unit immediately for service.

7. Before installation of the manual control or lecture bottle control onto the cylinder of compressed or liquefied gas, move the cylinder(s) to the work location and secure the cylinder before removing the cylinder valve cap (if supplied). Check the cylinder valve as in step 5 for possible contamination and defective or loose parts. If for any reason the cylinder appears to be faulted as noted here, return the cylinder cap (if supplied) to the top of the cylinder, tighten down and remove the cylinder from the work area and call the supplier of the cylinder for immediate pick-up.

8. When using any hazardous gas, the cylinder of the gas should be placed under an exhaust hood or be placed in a suitable safety enclosure.

9. Before installation of the manual control or lecture bottle control onto the cylinder of compressed or liquefied gas, make certain that the CGA connection on the cylinder matches the CGA connection attached to the unit. CGA connections are fitted to the unit to limit the services in which the unit can be used. **The use of adaptors or alterations to the unit to change services can be extremely dangerous and should not be attempted.**

VI. INSTALLATION

Before attachment of the manual control or lecture bottle control to the cylinder, read carefully the "USER RESPONSIBILITY" and "SAFETY PRECAUTIONS" sections of this manual.

1. Before removing the cylinder cap (if supplied), move the cylinder of gas to the work area:
   - 1.1 Secure the cylinder as to prevent accidental toppling
   - 1.2 Remove the cylinder cap (if supplied)
   - 1.3 Make certain that the cylinder valve is tightly closed
   - 1.4 Remove the cylinder plug, if present. If there is any sign of gas leaking

through the closed cylinder valve then replace the plug and contact the **Gas Supplier** immediately to arrange for disposal.

1.5 Inspect the cylinder valve for contamination or abuse

2. The user should put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.

3. Close the manual control or lecture bottle control by rotating the adjusting knob in a clockwise direction until the knob will turn no further

4. Following the procedures outlined below, make the connection of the manual control or lecture bottle control to the cylinder valve. Always use an open ended or adjustable wrench for attachment.
   - 4.1 **DO NOT FORCE.** The connection should be made easily. If it cannot be made easily, most likely the user has the wrong control unit for the gas service.
   - 4.2 **LEFT HAND THREADS** are used on some CGA connections. Notches in the middle of the hex nut usually identify left handed CGA connections.
   - 4.3 **GASKETS** are used in conjunction with some CGA connections. If the connection requires a gasket, one has been supplied with the control unit. Inspect the gasket for signs of contamination and abuse. Do not over-tighten the connection using a gasket as this will force the gasket to extrude into the gas stream.
   - 4.4 **NEVER USE LUBRICANTS OF ANY TYPE** on the control unit or cylinder valve to aid in connection.
   - 4.5 **NEVER USE TEFLON TAPE** to aid in the sealing of the CGA fitting to the cylinder valve.
   - 4.6 **CONTROL UNITS USED FOR OXIDIZING SERVICES** should be connected directly to the cylinder. Avoid the use of any intervening tubing.

5. Make the connections between the outlet of the control unit and the system to be supplied gas.
   - 5.1 **HOSE BARB CONNECTIONS** provided with MATHESON equipment are typically for use with 1/4" ID hose. Press hose onto the hose barb with enough force to retain the hose after tugging gently on the free end of the hose. Connect the other free end of the hose to a suitable hose connection on the equipment.

WARNING: Hose barbs are in effect relief devices. Do not secure the hose to the hose barb with any device. Hose barbs are meant to blow off under excessive pressure. Therefore, never use hose barb connections with any hazardous material that can be released into the work area. Make sure that the type of hose is compatible with the gas to be used.

5.2 **NATIONAL PIPE THREAD (NPT) CONNECTIONS** are supplied as outlet connections on some MATHESON units. Carefully inspect the pipe thread connections for contamination or abuse. Use only fittings or connections with NPT mating threads supplied by a reputable vendor. Carefully inspect the threads of the fittings or pipe to be used to connect the unit outlet with the equipment intended. Make the connection between the outlet of the unit and the equipment using an appropriate interconnecting material.

WARNING: NPT connections seal on the pipe threads of the fitting or outlet connection. Teflon tape can be used to help accomplish a seal but should be used sparingly as not to block the inside of the pipe. Contaminated or abused parts sometimes will not make a gas tight seal.

5.3 **COMPRESSION TUBE FITTINGS** are supplied as outlet connections on some MATHESON control units. Standard connections provided are 1/4" Female. These connections are for use with 1/4" OD rigid metal tubing. Dependent upon the application, the tubing material will either be Brass, Copper, Stainless Steel, or Monel. Connect the rigid tubing to the outlet of the regulator and then to the equipment utilizing the manufacturer's instructions for making compression tube connections.

WARNING: Most approved and reliable compression tube connections utilize ferrules for compression of the fitting onto the tube. These ferrules are to be used for one (1) connection only. Additional connections should always utilize new ferrules. Never use Teflon tape in making a compression tube connection.

5.4 **BEFORE OPERATION** of the control unit and associated equipment, **it is strongly recommended** that the user leak check the entire system to be pressurized using an inert gas and an approved method.

WARNING: This step is required when using any hazardous material.

VII. OPERATING INSTRUCTIONS

Read the "SAFETY PRECAUTIONS" and "INSTALLATION" sections before operation of the equipment.

WARNING: Manual controls and lecture bottle controls do not control flow or pressure accurately. These units are intended for dispensing gases on a short term basis to open ended systems, where there is no chance for the system to be dead ended or develop a back pressure. These units are not intended to throttle or control pressure or flow in any way whatsoever.

1. The manual control or lecture bottle control knob should be closed as described in "INSTALLATION" sections above.

2. The user should then put on appropriate safety apparel such as, but not limited to, safety glasses and gloves.

3. The user should then position himself/herself with the cylinder between themselves and the control unit. **Do not rest hands on or apply force to the control unit during the following charging operations.**

4. To avoid damage to the control unit's internal parts, open the cylinder valve **slowly**. Observe the high pressure gage (if supplied) for a rise in pressure to full cylinder pressure.

5. Observe all high pressure connections in the pressurized system for leaks.
   - 5.1 An approved soap solution, if compatible with materials and applications in use, can be used to check connections for leaks.
   - 5.2 An approved leak detecting device can be used to check for leaks. Consult the manufacturer's instructions for applications and hazards associated with the gas to be used in the system.
   - 5.3 If neither method above can be utilized, re-close the cylinder valve for a minimum of five minutes and observe the high pressure gage (if supplied) for a drop in pressure.
   - 5.4 If a leak is indicated, by any of the methods listed above, recheck the CGA connection to the cylinder and all other high pressure connections.
   - 5.5 If all of the connections indicate no leak and the control unit is still closed, and the pressure continues to fall on the high pressure gauge (if supplied), reduce pressure in the system as outlined in the "SHUTDOWN and DISASSEMBLY". Return the control unit for replacement (if new) or repair (if out of warranty) by following the procedure in the "LIMITED WARRANTY" section.

6. If the system has been leak checked as in step 5 and is found to be acceptable, open the cylinder valve completely in order to form a good seal within the cylinder valve. Keep the hand wheel or wrench (if required for this particular cylinder valve type) available at all times to allow for prompt shut-off in emergency situations.

7. Adjust the hand knob to allow pressure and flow to increase to the desired rate.
   7.1 Observe all low pressure connections in the pressurized system for leaks.
   7.2 Check connections for leaks with an approved soap solution, if compatible with materials and applications in use.
   7.3 An approved leak detecting device can be used to check for leaks. Consult the manufacturer's instructions for applications and hazards associated with the gas to be used in the system.

8. **Check the rest of the system for leaks as described above for leaks**.

9. Upon completion of the leak check begin use.
   9.1 With the gas flowing through the system, make any adjustment to that may be needed. Make all adjustments in accordance with the final equipment manufacturer's instructions.
   9.2 **As a general rule**, the cylinder should be considered empty when the cylinder pressure falls to twice (2x) the usable pressure.

WARNING: Manual controls and lecture bottle controls do not control flow or pressure accurately. These units are intended for dispensing gases on a short term basis to open ended systems, where there is no chance for the system to be dead ended or develop a back pressure. These units are not intended to throttle or control pressure or flow in any way whatsoever.

VIII. SHUTDOWN and DISASSEMBLY

As indicated in the OPERATING INSTRUCTIONS section, a cylinder is considered empty when the cylinder pressure has dropped to twice (2x) the delivery pressure or less.

1. **TEMPORARY SHUTDOWN** (Less Than 30 Minute Duration)
   Simply close the Gas Cylinder Valve.

2. **EXTENDED SHUTDOWN** (Beyond 30 Minute Duration)
   The following procedure is to be used with normally open systems or for complete system disassembly.
   - 2.1 Shut off the gas cylinder valve completely.
   - 2.2 Shut down any additional gas supplies that may be supplying gas to the system.
   - 2.3 Drain the contents of the control unit through the system in use.
   - 2.4 After venting (and purging when necessary), close the control unit.
   - 2.5 Disconnect the control unit from the system or downstream equipment.
   - 2.6 Disassemble the control unit from the cylinder by slowly loosening the cylinder connection. Listen for gas seepage. If leaking is evident, re-tighten the cylinder connection immediately and check the cylinder valve for proper closure. If the cylinder valve is in the closed position, and the regulator has been drained of all gases, contact the **Gas Supplier** immediately and notify him of the situation.
   - 2.7 Replace plug into cylinder valve outlet (where applicable). Replace the cap on the cylinder over the valve (if supplied). Remove the cylinder from the work place and put the cylinder into a safe storage area. Replace the empty cylinder with a new one and follow the procedures in the "INSTALLATION" section of this manual.
   - 2.8 When the control unit is removed from the system, make sure the control unit is closed. Cap the inlet and the outlet of the control unit with plastic caps and store in a plastic bag until needed again.

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