

# Installation and Use of 1/2 in. Back Pressure Regulator Kit

P/N 402013

INSTRUCTION SHEET

FLUKE®

Calibration

This kit is used to upgrade a 1/2 in. single or dual molstic-S platform that does not include the integrated back pressure regulator. This upgraded configuration is ideal for the situation where the device under test (DUT) will be tested while plumbed upstream of the molbloc-S, and where its outlet pressure must be set and controlled precisely, or its differential pressure must be limited.



*High pressure gases are potentially hazardous. Energy stored in these gases can be released unexpectedly and with extreme force. High pressure systems should be assembled and operated only by personnel who have been instructed in proper safety practices.*

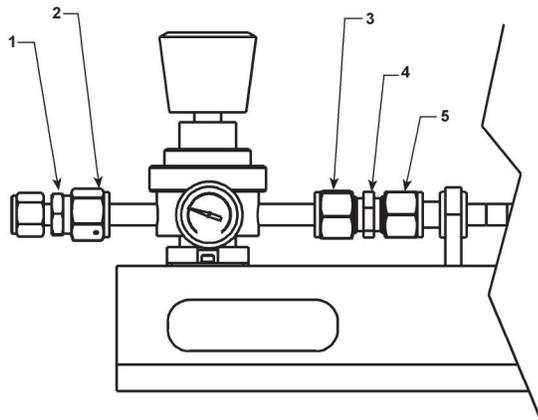


Figure 1. 1/2 in. molstic-S, with Back Pressure Regulator

## PREPARING THE REGULATOR FOR INSTALLATION

- 1 Using a pair of properly sized wrenches remove the VCR x tube adaptor (1) which is on the inlet end of the molstic-S. This will leave a female VCR swivel nut (5) as the molstic interface. Retain the adaptor for use on the inlet of the regulator. The VCR gaskets used in this connection are for one-time use and should therefore be discarded.
- 2 Place a new VCR gasket (P/N 102923) securely against the sealing surface inside the female VCR swivel nut of the regulator's inlet port (2).



*Over-tightening VCR connections will damage the sealing beads and possibly cause system leakage. Do not re-use metallic VCR gaskets.*

- 3 Install the adaptor retained from step 1 into the inlet port of the regulator. Using a backup wrench hold the

swivel nut stationary, and tighten the adaptor 1/8 turn past finger-tight.

- 4 Attach the regulator mounting bracket to the base of the regulator using the two included #10-32 socket head cap screws, #10 flat washers, and the #10 lock washers. The long side of the bracket should be perpendicular to the direction of flow through the regulator.
- 5 Place a new VCR gasket (P/N 102923) inside the female VCR swivel nut of the regulator's outlet port (3).
- 4 Thread the included 8VCR male union (4) into the female VCR swivel nut of the molstic-S.
- 5 Using a backup wrench hold the female swivel stationary, and tighten the union 1/8 turn past finger-tight.

## INSTALLATION OF REGULATOR ONTO MOLSTIC-S

- 1 Place a new VCR gasket (P/N 102923) securely against the sealing surface inside the female VCR swivel nut at the molstic-S inlet (5).
- 2 Place the regulator with its bracket on top of the molstic-S platform. Align the male VCR outlet fitting with the mating female VCR swivel nut and thread the nut onto the fitting.
- 3 Using a backup wrench hold the male VCR union stationary and tighten the VCR swivel nut 1/8 turn past finger-tight.
- 4 Place the flat side of the 60 mm nut plate under the molstic-S platform (Fig. 2,1). Align it with the holes in the platform and the regulator bracket. Hold it in place.

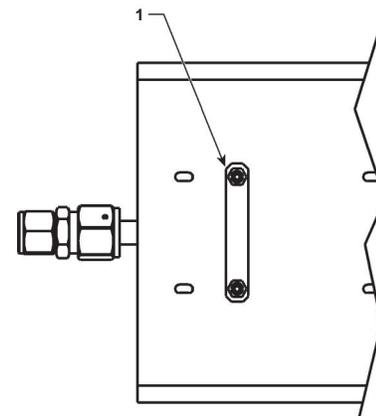


Figure 2. molstic-S Nut Plate

- 5 Thread the two M4 socket head cap screws and M4 flat washers through the regulator bracket and tighten them securely into the nut plate.
- 6 Place a new VCR® gasket (P/N 102183) inside the gauge port of the regulator. This port is marked "IN" on the regulator body and is perpendicular to the axis of flow of the regulator.
- 7 Install the included gauge into the port and hold in place while tightening the VCR nut 1/8 turn past finger-tight.

## SYSTEM PRESSURIZATION AND REGULATOR ADJUSTMENT



*During system operation, be extremely careful not to apply pressure in excess of the maximum operating pressure of the molbox: 600 kPaa (87 psia) for molbox1-A700K, 250 kPaa (36 psia) for molbox1-A350K.*

Once the test system with molbloc-S and molstic-S has been completely interconnected, the following procedure should be used for its safe pressurization and operation.

The pressure directly upstream of a back pressure regulator is controlled by adjusting the position of the control knob. Rotating the knob in the clockwise direction raises the upstream (control) pressure. Counterclockwise rotation, coupled with venting of the downstream side of the regulator plumbing, lowers the upstream pressure. molstic-S regulators are NOT self-venting therefore the upstream pressure will not be adjusted with rotation of the control knob unless the downstream gas is allowed to escape.

Make final adjustments of control pressure in the direction of increasing pressure in order to obtain the most accurate and stable set point.

### System Pressurization

- ➊ **Begin with system pressure vented:** Make sure that the system pressure is vented.
- ➋ **Set the system pressure to minimum:** Rotate the system supply regulator's adjustment knob counterclockwise until the spring force has been relieved.
- ➌ **Turn on gas supply:** Apply the supply pressure to the pressure control regulator.
- ➍ **Slowly raise system supply pressure:** Using the pressure reducing regulator upstream of the DUT, slowly raise the system pressure (by rotating the knob clockwise) to the desired operating pressure. Provide additional margin only if the final pressure will be within the safe operating range of the molbox. **Do not exceed the maximum operating pressure of the molbox.**

### Back Pressure Regulator Adjustment

- ➊ **Begin with pressure at minimum:** Rotate the back pressure regulator's adjustment knob counterclockwise until the spring force has been relieved.
- ➋ **Open molstic-S flow control/shut-off valve(s):** Valves must be open to allow test gas to flow through the system.
- ➌ **Open the DUT's flow control valve:** If the test system contains a DUT that has flow control capability, it must be opened slightly in order to allow pressure to pass through. All that is necessary is a small flow to allow the regulator to be adjusted.
- ➍ **Adjusting back pressure:** Rotate the back pressure regulator adjustment knob clockwise in order to raise the pressure level upstream of the regulator. Rotate the back

pressure regulator adjustment knob counterclockwise in order to lower the pressure level upstream of the regulator.

### Locking the Back Pressure Regulator Adjustment (Optional)

Once the Back Pressure Regulator has been adjusted to the desired level of upstream pressure, the adjustment knob can be locked down in order to prevent future adjustment if desired.

- ➊ **Remove regulator knob cover:** Use a small flat screwdriver to remove the plastic cap on the top of the regulator adjustment knob.
- ➋ **Remove the top jam nut:** Using the properly sized socket wrench, loosen and remove the jam nut located on top of the adjustment knob. Retain for later reinstallation.
- ➌ **Remove the adjustment knob:** Rotate the regulator adjustment knob counterclockwise to remove it from the regulator. Retain it for future use.
- ➍ **Tighten bottom jam nut:** Rotate the bottom jam nut clockwise until it gently bottoms out against the regulator body.
- ➎ **Tighten top jam nut:** Using a properly sized wrench, hold the bottom jam nut in position while using the socket wrench to tighten the top jam nut.
- ➏ **Retest system pressure:** Vent the system pressure. Repeat system pressurization procedure to verify the regulator back pressure setting. Readjust if necessary.

### Back Pressure Regulator Operation

During operation the back pressure can be more finely adjusted by rotating the back pressure regulator adjustment knob to obtain the desired pressure.

The following parts are included in the shipment:

DESCRIPTION	QTY	PART NO.
Regulator, back pressure	1	103527
Regulator bracket	1	123657
Gasket, 8VCR	4	102923
Gasket, 4VCR	2	102183
Union, 8VCR male	1	103236
SHC screw, #10-32 x 3/8	2	103277-Z
Split lock washer, #10	2	103021-Z
Flat washer, #10	2	103278-Z
SHC screw, M4 x 12	2	101016-Z
Flat washer, M4	2	100918-Z
Nut plate, 60 mm	1	123621
Gauge, pressure	1	103528
Adapter, 8VCR x 4VCRF	1	102920