

North American Impulse Multiplier

Bulletin 7266



MULTIPLIES LOW DIFFERENTIAL OR STATIC AIR PRESSURE BY 3 TO 5 TIMES

FOR DIFFERENTIAL PRESSURES

A 7266 Impulse Multiplier converts a low differential pressure signal to a high static impulse pressure, which is then applied to a gas or oil ratio regulator.

The 7266 can be set to multiply a differential signal between 3 and 5 times, e.g., an orifice plate (high fire) differential of 6"wc can be multiplied into a 28" wc impulse pressure to a 7216 or 7218 Air/Gas Regulator or a 7052 Air/Oil Ratiotrol.

Used in this way the 7266 enables a pressure-balancing regulator to be used as a flow balancing device, assuming the fuel remains at a constant Btu value and temperature.

A common use is with an orifice plate differential pressure on the inlet (cold air) side of a recuperator. As the recuperator temperature rises, so does the combustion air temperature, resulting in reduced air flow (scfh). With a conventional cross-connected regulator system, the air/fuel ratio would go increasingly rich.

A 7266 eliminates this problem by responding to actual (cold) air flow across an orifice plate: As combustion air temperature increases, air flow and orifice differential decreases. The 7266 responds by proportionally reducing impulse pressure to the ratio regulator, thereby maintaining air/fuel ratio.

The 7266 impulse multiplier can also be used to multiply a low **static** air signal. Straight cross-connected pressure balancing ratio regulators cannot produce adequate fuel pressures on some burners with low combustion air pressures. The 7266 can multiply the static air signal by 3 to 5 times.

INSTALLATION/OPERATION

The 7266 Impulse Multiplier is a pressure-balanced regulator that uses an adjustable bleed (about 1 cfm) to obtain the desired multiplied outlet (impulse) pressure: Increased bleed means higher outlet pressure (so inadvertent restriction of the bleed results in lower outlet pressures and leaner air/fuel ratios [a fail-safe situation]).

The 7266 is installed in a ¾" air line with a supply pressure 4 psi above desired high fire impulse pressure.

Per Figure 1 (page 2), an orifice plate pressure differential is applied to the 7266's lower diaphragm. If used for multiplying a low static air signal, the top side of the lower diaphragm is left open to atmosphere.

Supply air to the 7266 can come from either a blower or a compressed air system. An 8645A-01 Filter/Separator is recommended in the supply line. If compressed air is the source, use a regulator (such as North American's R690-1407, see page 3) to assure constant inlet pressure to the 7266.

One 7266 can serve any number of ratio regulators in the same control zone.

SPECIFICATIONS

Body Size: ¾" x ¾" fpt

Maximum inlet pressure: 4 psi emergency
2 psi operating

Maximum outlet pressure: 48" wc

Operating temperature: 180 F max

Impulse connections and vent: ¼" fpt

Approximate weight: 26 pounds

Dimensions: See Figure 2

Materials

Body: cast iron

Spring case/cover: aluminum

Diaphragms: DuPont Fairprene®

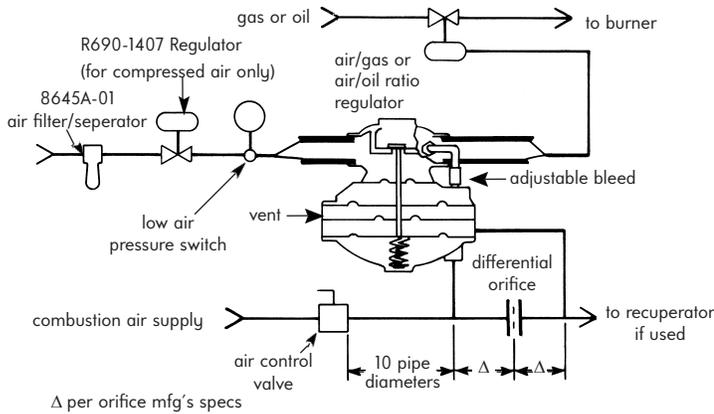
Diaphragm plate: steel

Valve seat: brass

Valve facing: Buna

Internals: steel, cadmium plated steel, brass

Figure 1. Typical Installation



5. Set impulse pressure for required low fire value by adjusting the spring on the bottom of the 7266: CW to increase, CCW to decrease. (See example below).

Example:

$Q_1 = 30,000$ scfh combustion air at high fire

$Q_2 = 6000$ scfh combustion air at low fire (5:1 turndown)

$\Delta P_1 = 6$ "wc combustion air differential pressure at high fire:
Adjust **7266 bleed** for up to 30"wc to ratio regulator (5 x 6"wc).

$\Delta P_2 =$ combustion air differential pressure at low fire

Using the square root law, determine ΔP_2 as follows:

$$\frac{Q_2}{Q_1} = \sqrt{\frac{\Delta P_2}{\Delta P_1}} \quad \text{or} \quad \left(\frac{Q_2}{Q_1}\right)^2 \times \Delta P_1 = \Delta P_2$$

$$\left(\frac{6000}{30000}\right)^2 \times 6 \text{''wc } \Delta P = 0.24 \text{''wc low fire combustion air:}$$

Adjust spring for 1.2"wc impulse (for 5 x multiplication).

ADJUSTING THE 7266

Initial

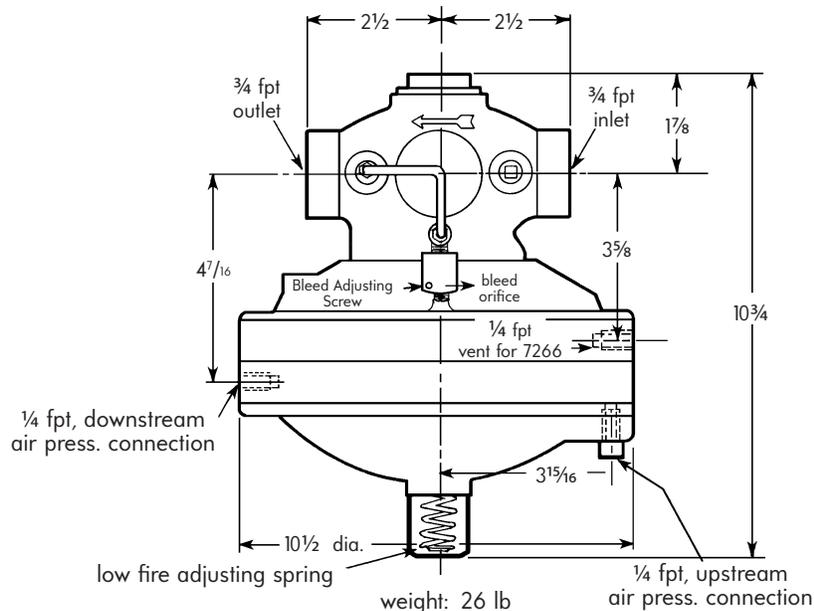
(compressed air and combustion air only -- gas off)

1. Set compressed air regulator (R690-1407) outlet pressure (for 7266 supply air pressure) between a maximum of 55" wc and a minimum of 7" wc above desired high fire impulse pressure.
2. Set combustion air control valve at high fire (for maximum static or differential combustion air pressure).
3. Set impulse pressure for required high fire value (up to 5 x combustion air static or differential) by adjusting Bleed Adjusting Screw: CW to decrease, CCW to increase.
4. Set combustion air control valve at low fire. A turndown rate of 5:1 is within the capability of the 7266.

Final

1. Light burners and adjust limiting orifice valves (1807 or 1813) and ratio regulators (7218 or 7052) as in a conventional system.
2. Recheck all settings at low and high fire; readjust as necessary.

Figure 2. 7266 Impulse Multiplier (dimensions)



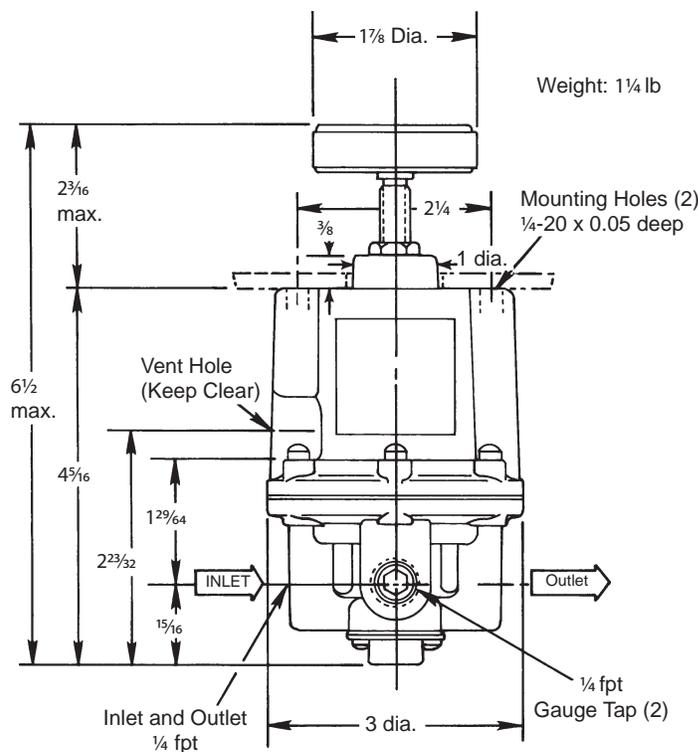
For use with 7266-0 Multiplying Air Regulator



The R690-1407 Compressed Air Pressure Regulator is recommended for use with the 7266-0 Multiplying Air Regulator to insure a constant air supply pressure. Install the R690-1407 upstream of the 7266-0, and also upstream of the 8645A-01 Air Filter-Separator if one is used.

Maximum inlet pressure is 500 psi; outlet can be set between 0 and 2 psi. Set pressure will be maintained to within 1/8"wc. An integral relief valve will instantly vent excess pressure as little as 0.01 psi above set pressure. Ambient temperature limits are - 40 F to 200 F.

DIMENSIONS inches



DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM FIVES NORTH AMERICAN COMBUSITON, INC. IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

WARNING: Situations dangerous to personnel and property may exist with the operation and maintenance of any combustion equipment. The presence of fuels, oxidants, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc., are inherent with any combustion application. Parts of this product may exceed 160F in operation and present a contact hazard. Fives North American Combustion, Inc. urges compliance with National Safety Standards and insurance Underwriters recommendations, and care in operation.



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