

March 2010

Types R110, R961, and R962 Automatic Changeover Regulators

WARNING

Fisher equipment must be installed, operated, and maintained in accordance with federal, state, and local codes and Fisher instructions. The installation in most states must also comply with NFPA No. 54 and 58 Standards. If used on recreational vehicles, installation and use must comply with NFPA No. 501C.

Only personnel trained in the proper procedures, codes, standards, and regulations of the LP-gas industry should install and service this equipment. Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion and/or fire causing property damage and personal injury or death.

Things To Tell The Gas Customer:

1. Point out the regulator's vent to the customer and **stress that this opening must remain unobstructed at all times**. Tell the customer to be sure to check the vent opening after a freezing rain, sleet storm, or snow to make sure ice has not formed in the vent.
2. Show the customer the shutoff valves on the cylinders. The customer should close these valves immediately if gas can be smelled, appliance pilot lights fail to stay on or appear higher than usual, or any other abnormal situation occurs.
3. Tell the customer to call your company to service the regulator if the regulator vents gas or a leak develops in the system. Only a qualified gas serviceman should install or service the regulator.
4. Inform the user that the supply cylinder is not completely empty until the red warning flag is fully visible in the indicator window (B), Figure 2.

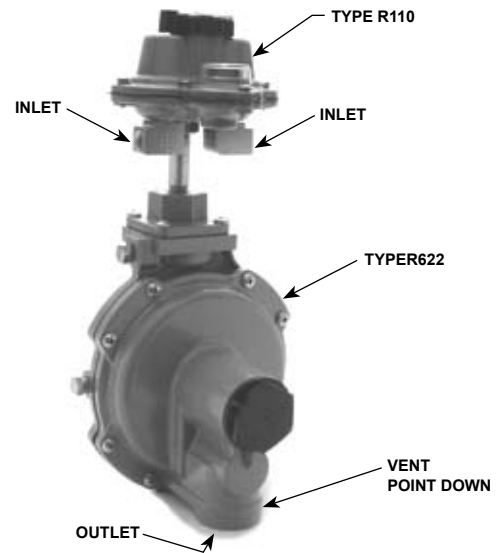


Figure 1. Type R962

Introduction

Scope of Manual

This instruction manual covers installation and maintenance for Type R110 automatic changeover manifolds and Types R961 and R962 automatic changeover regulators.

Description

The manifold and regulators are designed for low pressure (inches of water column) vapor service and are not to be used for liquid service.

Type R110 withdraws gas from one cylinder until pressure drops to 7 psig (0,48 bar) and then automatically switches to the reserve cylinder. The Type R110 must be used in conjunction with a second-stage regulator.

Types R961 and R962 are composed of the Type R110 connected to the inlet of either a Type 912 or R622 second-stage regulator.

Types R110, R961, and R962

Specifications

TYPE NUMBER	INLET AND OUTLET CONNECTIONS		SECOND-STAGE REGULATOR	VENT OPENING	VAPOR CAPACITY, BTU/HR PROPANE
	Inlet	Outlet			
R110/21	1/4-inch Inverted Flare	1/4-inch FNPT	---	Hole	500,000
R961/21	1/4-inch Inverted Flare	3/8-inch FNPT	912	Drilled and Screened	125,000
R962/21	1/4-inch Inverted Flare	1/2-inch FNPT	R622	3/4-inch FNPT	600,000

Note

These instructions assume that the Type R110 manifold has been assembled to a suitable second-stage regulator.

Specifications

Specifications are shown above for the manifold and the regulators. Contact the factory if the equipment is to be used on any service other than LP-gas, natural gas or air. Temperature limits are -20° to 160°F (-29° to 71°C) and the maximum inlet pressure is 250 psig (17,2 bar).

Installation



WARNING

On recreational vehicle applications, the regulators must be installed in a compartment or under a protective cover.

All vents should be kept open to permit free flow of air into and out of the regulator. Protect openings against the entrance of rain, snow, ice formation, paint, mud, insects, or any other foreign material that could plug the vent.

LP-gas may discharge to the atmosphere through the vent. An obstructed vent which limits air or gas flow can cause abnormally high pressure that could result in personal injury or property damage.

Make sure gas flow through the regulator is in the correct direction. There are two 1/4-inch inverted flare inlet connections and the "Outlet" connection is clearly marked on the regulator. The installation should be adequately protected from vehicular traffic and damage from other external sources.

Install the regulator high enough above ground level—at least 18-inches (457 mm) – so that rain splatter cannot freeze in the vent. Whether a protective hood is used or not, do not install the regulator in a location where there can be excessive water

accumulation or ice formation, such as directly beneath a down spout, gutter, or roof line of a building.

Types R961 and R962 can be installed without a protective hood if their vent is pointed vertically down, see Figure 1. When any of the regulators are used on recreational vehicles, a hood or enclosure is required to protect the regulator's vent from road splatter.

Before installing the regulator, check for damage which might have occurred in shipment. Also check for and remove any dirt or foreign matter which may have accumulated in the regulator body or the pipeline. The outlets of the cylinder valves should be cleaned to remove dirt or water. One method of doing this is by cracking the cylinder valve open for a short period of time to blow out the dirt. Apply pipe compound to the male threads of the pipe.

Operation

Place one of the two cylinders in "Supply" by rotating the changeover knob (A), see Figure 2, either way as far as it will go. The arrow will denote the "Supply" service side. Open both cylinder valves slowly.

Gas will now flow from both cylinders through pigtailed into the first-stage section of the Type R110 by way of the inlet fittings. When a pressure of 7 psig (0,48 bar) is reached beneath the Type R110 diaphragm, the closing spring in the inlet fitting will shutoff gas from the "Reserve" cylinder.

Gas from the "Supply" cylinder will continue to enter the first-stage regulator in the inlet fitting until approximately 15 psig (1,03 bar) is maintained. The second-stage regulator (Type 912 or R622) reduces this pressure to 11-inches wc (0,03 mbar) for the appliances.

The "Supply" side of the first-stage regulator will continue to supply gas as long as sufficient gas remains in the "Supply" cylinder. When pressure in the cylinder drops to about 7 psig (0,48 bar), the "Reserve" side of the first-stage regulator will open and maintain 5 psig (0,35 bar) pressure to the second-stage regulator, which continues to regulate at 11-inches wc (0,03 mbar). At the time the "Supply" cylinder becomes exhausted, a red warning flag appears in the indicator window (B) and also on the remote indicator if used.

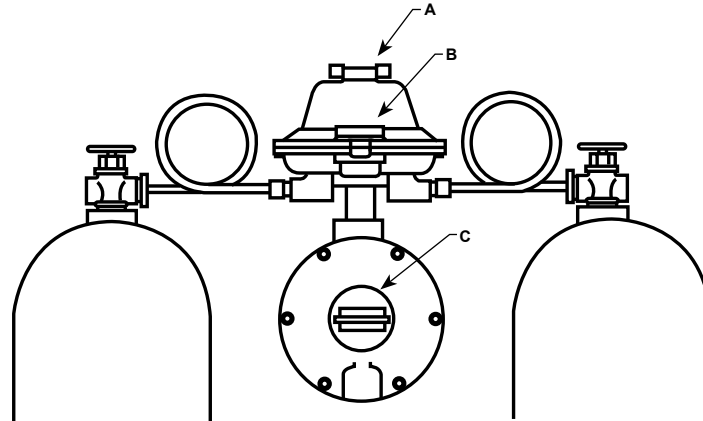


Figure 2. Typical Hook-up

Exchange of Cylinders

Before removing the empty cylinder, be sure to rotate the changeover knob (A) so that it points to the other cylinder. Then close the valve of the empty cylinder to prevent air from entering the cylinder and disconnect the cylinder. Clean the cylinder valve's outlet in the new cylinder. After the new cylinder is in place, slowly open the cylinder valve.

CAUTION

There will still be pressure in the empty cylinder.

The new cylinder now becomes the reserve cylinder, and the red warning flag will not be visible at the indicator window. If only one cylinder is left connected, the pigtail or hose to the other cylinder must be capped to prevent leakage or contamination.

WARNING

The pigtail or hose must be capped because gas will escape to the atmosphere through the open connection if pressure in the supply cylinder drops to 5 psig (0,35 bar) (red indicator flag visible). Turning the changeover knob to the disconnected side will also permit gas to escape.

Adjustment

Type R110 is factory set and is non-adjustable. Each second-stage regulator is individually factory set to deliver 11-inches wc (0,03 mbar). If it becomes necessary to increase outlet pressure, remove the closing cap (C), Figure 2, and turn the adjusting screw clockwise. Turn the adjusting screw counterclockwise to decrease the outlet pressure. A pressure gauge or water manometer is needed to determine the regulator's outlet setting after adjustment. Always replace the closing cap after the adjustment is made.

Overpressure Protection

WARNING

Personal injury or system damage may result if these regulators are installed without appropriate overpressure protection. Outlet pressures greater than 3 psig (0,21 bar) above the set point may cause damage to regulator parts, leaks in the regulator, or personal injury due to bursting of pressure-containing parts or explosion of accumulated gas.

If the regulator is exposed to an overpressure condition, it must be inspected for any damage that may have occurred.

Large volumes of gas may discharge through the regulator vent during internal relief valve operation which can result in fire or explosion from accumulated gas.

The regulators have an internal relief valve that opens when downstream pressure reaches approximately 1 psig (0,07 bar) on regulators set at 11-inches wc (0,03 mbar). When the internal relief valve opens, gas escapes to the atmosphere through the regulator's vent. The internal relief valve gives overpressure protection against excessive build-up resulting from seat leakage due to worn parts or chips of foreign material on the orifice.

Some type of external overpressure protection must be provided if inlet pressure will be high enough to damage downstream equipment. Common methods of external overpressure protection include relief valves, monitoring regulators, shutoff devices, and series regulation. The internal relief valve with the 3/4-inch (19,1 mm) vent (Type R962) limits downstream pressure to 2 psig (0,14 bar) as long as inlet pressure to the second-stage portion does not exceed 20 psig (1,40 bar) and the vent is unobstructed.

Types R110, R961, and R962

Maintenance



WARNING

To avoid personal injury or equipment damage, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure.

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Only parts manufactured by Fisher should be used for repairing Fisher regulators. Relight pilot lights according to normal startup procedures.

Due to normal wear or damage that may occur from external sources, these regulators must be inspected and maintained periodically. The frequency of inspection and replacement of the regulators depends upon the severity of service conditions or the requirements of local, state, and federal regulations. Even under ideal conditions, these regulators should be replaced after 15 years from the date of manufacture or sooner should inspection reveal the need.

Visually inspect the regulator each time a gas delivery is made for:

1. Improper installation.
2. Plugged or frozen vent.
3. Wrong regulator or no regulator in the system.
4. Internal or external corrosion.
5. Age of the regulator.
6. Any other condition that could cause the uncontrolled escape of gas.

LP-Gas Equipment

Emerson Process Management Regulator Technologies, Inc.

USA - Headquarters
McKinney, Texas 75069-1872 USA
Telephone: 1 (800) 558-5853
Telephone: 1 (972) 548-3574

For further information visit www.fisherregulators.com/lp

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Failure to do the above could result in personal injury or property damage.

Make sure the regulator's vent does not become plugged by mud, insects, ice, snow, paint, etc. The vent screen aids in keeping the vent from becoming plugged, and the screen should be clean and properly installed.

Replace any regulators that have had water in their spring case or show evidence of external or internal corrosion. Checking for internal corrosion may require complete removal of the adjusting screw and shut down of the gas system. Correct any improper installations.

Older regulators are more likely to catastrophically fail because of worn or corroded parts. Replace regulators over 15 years of age; other service or environmental conditions may dictate replacement of the regulator before it becomes 15 years old, refer to Fisher Bulletin LP-32.

Regulator Repair

Regulators that have been disassembled for repair must be tested for proper operation before being returned to service. Fisher Type Y499-2 test rack can be furnished for this purpose. Only parts manufactured by Fisher should be used for the repair of Fisher regulators. Be sure to give the complete type number of the regulator when corresponding with the factory.