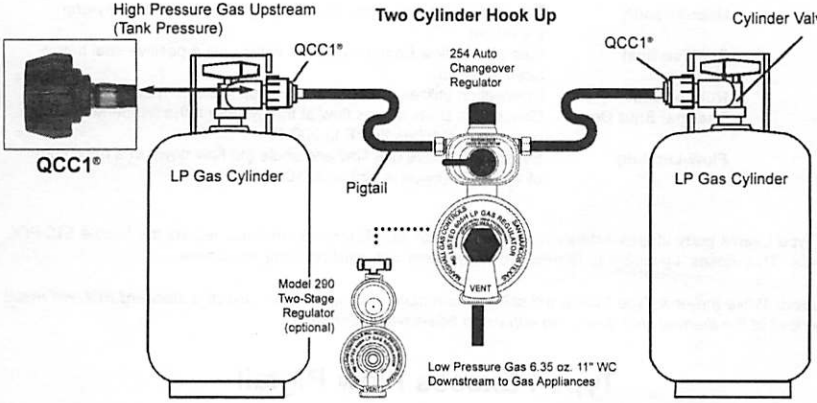
What You Should Know About Your LP Gas System and its Proper Care

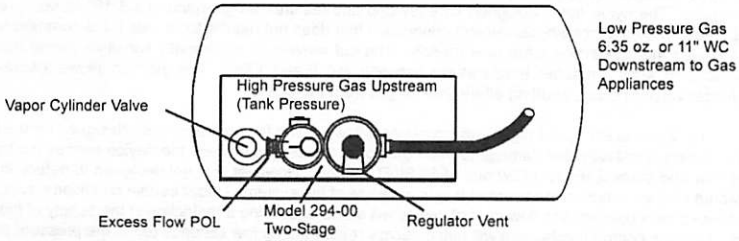
Overview of Typical LP Gas Hook Up



Tee Check

For the Model 290 the tee check allows you to run two LP gas cylinders through one LP gas regulator by using a pigtail from each cylinder valve to the tee check. This converts your regulator to a manual changeover. Open the valve on the cylinder and use the cylinder until empty or almost empty, then open the valve on the reserve cylinder, close the valve on the first cylinder, disconnect it and have it refilled. A disc check built into the tee will prevent gas from escaping when the empty cylinder is disconnected.

ASME Tank or Single Tank Hook Up



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Marshall Products

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Introduction

Beginning in 1998, Recreational Vehicles may be equipped with a Type I cylinder connection device. The new LP gas connection replaces the previously used CGA 510 (POL) left-hand threaded connection. The Type I connection works with a mating Type I cylinder valve that has been required on 20-lb. DOT cylinders supplied with LP gas grills since 1994, and has been required on all 4-40-lb. DOT LP gas cylinders since October 1998, but not on ASME tanks.

The Type I connection system offers the following features:

User-Friendly	Connection is made without tools using a "right-hand" easy-grip swivel nut.
Positive Seal	Gas will not flow from the cylinder valve until a positive seal has been achieved.
Rubber Seal	Connection utilizes a rubber seal versus metal-to-metal.
Thermal Shut Down	Connection shuts off gas flow at the cylinder if the temperature of the connection reaches 240°F to 300°F.
Flow-Limiting	Senses excessive gas flow and shuts the flow down to a maximum of 10 SCFH (by-pass airflow at 100 PSI).

The Type I valve body utilizes exterior right-hand 1-5/16" ACME threads and also retains the female 510 POL threads. This makes it possible to fill new Type I cylinders with existing filling equipment.

*(**Caution:** While the new Type I valve will still accommodate a standard POL, use of a standard POL will result in the loss of the thermal shut down and enhanced flow-limiting features.)*

Type I Excess Flow Pigtail

The Marshall RV Type I pigtail consists of a green nylon swivel nut attached to a hose by means of a brass nipple. The nylon nut is designed for easy-grip and features a right-handed 1-5/16" ACME thread. The ACME thread allows a smooth, convenient connection that does not require tools. Also, the common right-hand thread makes the connection more user-friendly. The nut swivels on a thermally sensitive sleeve that is engineered to yield when it reaches temperatures between 240°F and 300°F. This yielding allows a back-check in the cylinder valve to close, shutting off the flow of gas from the cylinder.

The Marshall RV Type I pigtail also contains a flow-limiting feature specifically designed for the RV application. If there is catastrophic damage to the regulator of the LP gas system, the device senses the higher rate of gas flow and shuts down to a flow rate of 10 SCFH or less. However, it is not designed to detect all leaks, or totally shut off the system in the event of a leak or failure of the system. Under certain conditions, such as when a cylinder valve is opened, this flow control device will activate, causing a restriction in the supply of fuel to appliances. The flow control mechanism will automatically reset within a few seconds (once the pressure has equalized in the system), provided there are no leaks in the system and all appliances have been turned off.

Type I Excess Flow Pigtail
continued

To remedy a low or restricted flow condition, the following procedures should be followed each time the cylinder is opened or restricted flow is evident *(for example low flame or yellow flame at burner)*:

1. Extinguish all flames and smoking materials.
2. **Important: Be sure all gas appliances, including their pilot lights, are off and gas is not flowing in the system.**
3. Open the LP gas cylinder valve slowly. **DO NOT SNAP OPEN.**
4. Be sure all connections have been tested with a soapy solution (non-ammonia dish washing liquid) or leak detector solution to assure that the system is leak free.

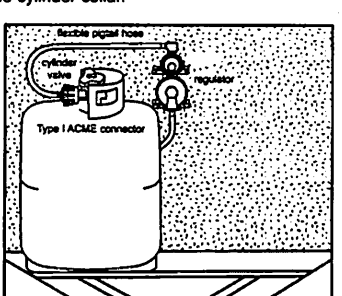
CAUTION: Never use a match or other flame to check for leaks.

5. Wait at least 15 seconds before lighting appliances.
6. If operational difficulties continue, have the system inspected by a qualified RV service technician.

Both Marshall Brass and Marshall Gas Controls helped pioneer the first Type I appliance-side connection device, utilized on LP gas grills since 1993. The grill connection, which utilizes a BLACK nylon swivel nut, has been modified to accommodate the greater BTU requirements for RV applications, and Marshall supplies the GREEN nylon swivel nut for RV applications to distinguish it from the black one utilized on grills.

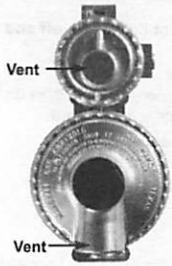
WARNING: LP gas is highly flammable. If a leak is detected, immediately extinguish all flames and smoking materials, evacuate the RV, and close valve(s) on LP gas cylinder(s). Leaking LP gas will cause a fire or explosion if ignited, and may result in property damage, bodily injury, or both.

With the new features and benefits of the Type I ACME connection, there are new requirements for mounting regulators, orientating cylinder valves, and routing flexible pigtails to ensure all the new features perform as intended. For example, it is recommended that two stage regulators that were traditionally connected directly to the cylinder valve now be mounted remotely from the valve with the connection being made with a flexible pigtail hose between the cylinder valve and the regulator. ***(See illustration below)***. This will help reduce the possibility of side load which may cause a leak at the connection or interfere with thermal activation. To assure that the movement required for thermal activation is not restricted, pigtail lengths and valve orientations are recommended that minimize side load forces and prevent hoses from pushing against rigid cylinder covers or compartment walls and doors. The hose must not extend beyond the shoulder of a cylinder when a rigid cover is used. The hose must not push against compartment walls or doors in a way that will restrict lateral movement needed for thermal activation. It is also recommended that hose lengths and cylinder valve orientations be positioned to eliminate tension or pulling on hoses that may cause kinking of the hose, side load forces on the connection or contact with the edges of the cylinder collar.

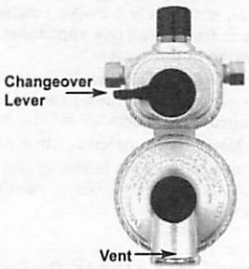


LP Gas Regulators

Marshall Gas Controls
290-00 Two-Stage Regulator



Marshall Gas Controls
254-00 Changeover Regulator



HOW SHOULD YOUR REGULATOR BE MOUNTED?

The regulator will function regardless of the position in which it is mounted. However, ANSI A119.2, NFPA 501C Recreational Vehicles Code at 2-2.7.6 provides in part, "The regulator(s) shall be mounted only in a position (with the vent pointed) downward within 45 degrees of vertical and the diaphragm area being drained." (emphasis added). It is important to install the regulator in a position in which the cover cannot possibly become a receptacle for water or other foreign material.

WHAT IS A TWO-STAGE REGULATOR?

The Marshall 290 series integral two-stage regulator is a high pressure regulator combined with a second-stage regulator. The high pressure regulator reduces the full cylinder pressure within 10-13 PSIG range. The second stage then reduces this inlet pressure down to 11 inches of water column (0.4 PSIG) outlet pressure.

With single-stage regulation, the regulator functions under extreme variations of inlet pressure caused by the changes in outside temperature. As a result of these variations in inlet pressure, minor variations in outlet pressure are possible.

Two-stage regulation results in a consistent inlet pressure to the second-stage, thereby minimizing minor outlet pressure variations from the second-stage regulator.

Additionally, moisture caused by water in the LP gas or condensation can result in ice forming at the orifice. This can result in a gas stoppage. The possibility of freeze up is greatly reduced with two-stage LP gas regulation.

WHAT IS A CHANGEOVER REGULATOR?

The Marshall 254 two-stage changeover regulator offers the convenience of changeover from empty to full gas cylinders, plus the additional efficiency of two-stage pressure regulation. The top portion of the changeover is a dual high pressure regulator, which reduces bottle pressure to approximately 10 to 15 PSIG and sends it to the second stage regulator, which completes the regulation process by reducing the 15 PSIG inlet pressure down to 11 inches of water column (0.4 PSIG) outlet pressure.

Make sure there is propane in both cylinders before you start. Rotate the black lever on the top front side of the regulator toward the cylinder you want to use first.

This will be the "service" cylinder and the other will be the "reserve" cylinder. Slowly open both cylinder valves. The indicator on the top of the regulator will turn bright green. The indicator color will stay green as long as there is fuel coming from the service cylinder. When the service cylinder empties, the regulator will start drawing from the reserve cylinder providing an uninterrupted fuel flow to the system. When it switches over, the indicator color changes from green to red. This red color signals that the service cylinder is empty and needs to be filled. To remove the empty cylinder, rotate the black lever all the way over towards the reserve cylinder. The indicator will turn green and the reserve cylinder becomes the service cylinder. Next, shut off the cylinder valve on the empty cylinder. Now disconnect the cylinder and have it refilled. After filling, reconnect the pigtail and slowly open the cylinder valve. The full cylinder now becomes the reserve cylinder.

THE REGULATOR COVER

UL 144 requires a cover on certain types of LP gas regulators. However, it is a good idea for all regulators to be protected from the elements with a cover regardless of whether it is required or not.

Flexible Hoses

The 40407 and 42421 series adaptor hoses have a safe, convenient, design that makes them ideal for hooking up portable, high pressure propane appliances such as camp stoves, lanterns, and table top grills to large cylinders. The 40407 hose is a convenient soft nose handwheel POL which requires no wrench for tightening, with a brass 1"-20 male swivel fitting that threads to the appliance side. The 42421 hose has a appliance connection 1"-20 male swivel, while the tee fitting connection is a 1"-20 female swivel.

The concerns of flexible hose are sunlight (ultra violet rays) and ozone. Consequently, your hoses should be checked periodically for signs of aging. The average life of a LP gas hose depends on the care and protection given them. For your protection, check your hoses before each season's use and each time your LP gas tank(s) are refilled for signs of deterioration or weather cracking. Protect the hoses from direct sunlight whenever possible and be sure when replacing your hose that you purchase properly rated, UL or CGA listed replacement hose assemblies.

HOW TO KEEP YOUR REGULATOR OPERATING EFFICIENTLY & SAFELY

Your regulator is equipped with a vent which allows the diaphragm to "breathe." The diaphragm of the regulator moves down and draws air into the bonnet or adjustment spring housing. When the diaphragm moves up, air is expelled through the vent. In the event that excess pressure builds up in the lower housing or body of the regulator, a relief mechanism vents it to the atmosphere. It is imperative to check the vent frequently to be sure it is clean and free of water, corrosion or obstruction, as clogging is a potential cause of regulator malfunction. Great care has been taken in the manufacture of your regulator and it has been thoroughly tested and UL listed.

However, even a small piece of dirt, corrosion, pipe dope or other foreign material which finds its way into the regulator can result in higher than normal pressure (high lockup) and/or loss of fuel.

If the vent does become clogged it can easily be cleaned with a toothbrush. In addition, your regulator should be checked periodically by a competent LP serviceman to be sure it is properly adjusted and in safe working condition. By following these simple precautions your regulator should give you years of trouble-free service.

WHAT IS REGULATOR FREEZE UP ?

A regulator will not freeze, nor will LP gas under normal atmospheric conditions. However, as the gas passes through the regulator it expands and cools and moisture in the gas or in the regulator may turn to ice. This ice can build up and totally or partially block the orifice and thus partially or totally block the fuel supply. There are a number of things you can do to prevent this type of freeze up:

1. Be sure your LP cylinder is totally free of moisture before it is filled.
2. Be sure your cylinder is not over filled. This is particularly important if you have a permanently mounted ASME tank.
3. Keep the valves on empty cylinders closed.
4. Have your LP gas dealer purge the cylinder if freeze up occurs.
5. Have your LP gas dealer inject methyl alcohol in your cylinder.
6. Install a two-stage regulator if your system has only a single-stage regulator.

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Marshall Products

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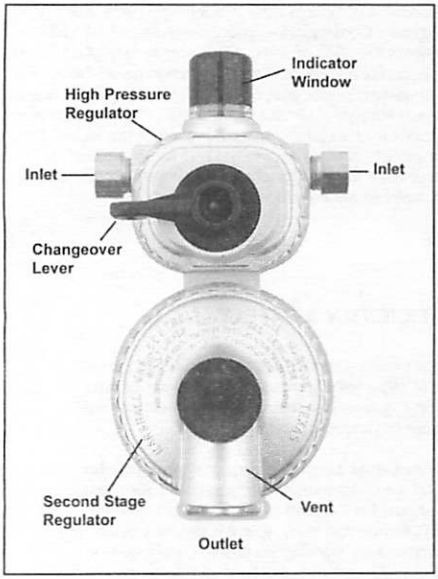
Product Information

Marshall Products

Model 254-00 Regulator



Regulator Specifications

BTU Capacity (propane)
Service Cylinder: 210,000 BTU/HR[1]
BTU Capacity (propane)
Reserve Cylinder: 130,000 BTU/HR[1]
Inlet: 1/4" Female inverted flare
Outlet: 3/8" FNPT
Diaphragm: Fabric reinforced high pressure & 2nd stage diaphragm
Weight: 1.35 lbs
Dimensions: 5-3/4"**L**, 3-1/8"**W**, 2-1/2"**D**
Underwriters Laboratories Listed
Second Stage Relief Mechanism: Per UL 144
Mounting Holes: 3-1/2" on center
Body: Zinc die cast

[1] Average based on 25 PSIG inlet pressure and 9" WC outlet pressure at manufacturer's standard setpoint
[2] Setpoint: Inlet=100 PSIG, Outlet=11" WC, Flow rate=30 SCFH air

Introduction

Thank you for purchasing the Model 254 regulator. The Model 254-00 two-stage changeover regulator offers the convenience of changeover from empty to full gas cylinders, plus the additional efficiency of two-stage pressure regulation. The top portion of the changeover is a dual high pressure regulator, which reduces container pressure to approximately 10 to 15 PSIG and sends it to the second stage regulator, which completes the regulation process by reducing the 15 PSIG inlet pressure down to 11 inches of water column (0.4 PSIG) outlet pressure. **NOTE: THE 254-00 IS AN INTEGRAL, TWO-STAGE REGULATOR THAT MEETS RVIA REQUIREMENTS FOR USE ON RECREATIONAL VEHICLES AND COMPLIES WITH REVISED UL 144 REQUIREMENTS (JUNE1998) AND NFPA REQUIREMENTS.**

Installation

The regulator will function regardless of the position in which it is mounted. However, ANSI A119.2, NFPA 501C Recreational Vehicles Code 2-2.7.6 provides in part, "The regulator(s) shall be mounted only in a position (with the vent pointed) downward within 45 degrees of vertical and the diaphragm area being drained"(emphasis added). It is important to install the regulator in a position in which the cover cannot possibly become a receptacle for water or other foreign material. Marshall suggests following these same installation guidelines as it pertains to vent location for all applications.

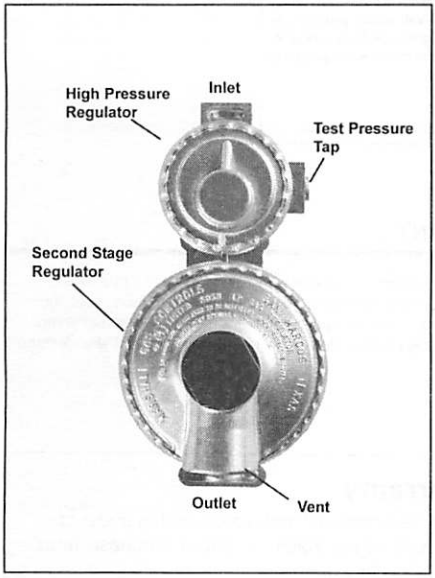
Operation

Make sure there is propane in both cylinders before you start. Rotate the black lever on the top front side of the regulator toward the cylinder you want to use first. This will be the "service" cylinder and the other will be the "reserve" cylinder. Slowly open both cylinder valves. The indicator on the top of the regulator will turn bright green. The indicator color will stay green as long as there is fuel coming from the service side. When the service cylinder empties, the regulator will start drawing from the reserve cylinder providing an uninterrupted fuel flow to the system. When it switches over, the indicator color changes from green to red. This red color indicates that the service cylinder is empty and needs to be filled. To remove the empty cylinder, rotate the black lever all the way over towards the reserve cylinder. The indicator will turn green and the reserve cylinder becomes the service cylinder. Now shut off the cylinder valve on the empty cylinder. Now disconnect the cylinder and have it refilled. After filling, reconnect the pigtail and slowly open the cylinder valve. The full cylinder now becomes the reserve cylinder.

Product Information

Marshall Products

Model 290-00 Regulator



Regulator Specifications

BTU Capacity (propane): 160,000 BTU/HR[1]
Inlet: 1/4" FNPT
Outlet: 3/8" FNPT
Diaphragm: Fabric reinforced high pressure & second stage diaphragm
Weight: 1.09 lbs.
Dimensions: 5-1/4"**L**, 3-1/8"**W**, 2-5/8"**D**
Underwriters Laboratories Listed
Second Stage Relief Mechanism: Per UL 144
Mounting Holes: 3-1/2" on center
Body: Zinc die cast

[1] Average based on 25 PSIG inlet pressure and 9" WC outlet pressure at manufacturer's standard setpoint[2]
[2] Setpoint: Inlet=100 PSIG, Outlet=11" WC. Flow rate=30 SCFH air

Introduction

Thank you for purchasing the Model 290-00 regulator. The Model 290 series integral two-stage regulator is a high pressure regulator combined with a second-stage regulator. The high pressure regulator reduces the full cylinder pressure within 10-13 PSIG range. The second-stage then reduces the inlet pressure down to 11 inches of water column (0.4 PSIG) outlet pressure. **NOTE: THE 290-00 SERIES IS AN INTEGRAL, TWO-STAGE REGULATOR THAT MEETS RVIA REQUIREMENTS FOR USE ON RECREATIONAL VEHICLES AND COMPLIES WITH REVISED UL 144 REQUIREMENTS (JUNE1998) AND NFPA REQUIREMENTS.**

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Operation

With single-stage regulation, the regulator functions under extreme variations of inlet pressure caused by the changes in outside temperature. As a result of these variations in inlet pressure, minor variations in outlet pressure are possible. Two-stage regulation results in a consistent inlet pressure to the second-stage, thereby minimizing minor outlet pressure variations from the second-stage regulator.

Important

Do not attempt to adjust or remove test pressure tap. Only qualified persons should install, adjust or service LP gas regulators. If service is needed, contact a qualified LP dealer. Always make sure cylinders are properly filled and never accept cylinders that are over filled. When replacing newly filled cylinders to the regulator, check all connections for leaks with an approved leak detector solution or a mixture of non-ammonia soap and water. Never use matches or an open flame. **Note: Low pressure regulators are designed to regulate LP vapor only. Use of this regulator on LP systems equipped with ASME tanks which allow liquid or debris to enter the vapor system will nullify the warranty.**

IMPORTANT SAFETY INFORMATION

FOR YOUR MODEL 254-00, TWO-STAGE CHANGEOVER REGULATOR

Failure to rotate the black lever all the way over towards the reserve cylinder will allow propane to leak from the disconnected pigtail. Leaking propane, if ignited, will result in a fire that may cause property damage, bodily injury or death.

REMEMBER:
Never disconnect a pigtail if the indicator is red.

IMPORTANT

Only qualified persons should install, adjust or service LP gas regulators. If service is needed, contact a qualified LP dealer. Always make sure cylinders are properly filled and never accept cylinders that are over filled. When replacing newly filled cylinders to the regulator, check all connections for leaks with an approved leak detector solution or a mixture of non-ammonia soap and water. Never use matches or an open flame. Note: Low pressure regulators are designed to regulate LP vapor only.

Limited Warranty

Marshall warrants its products to be free from defects in material and workmanship under conditions of normal use for a term of one year from date of purchase. Proof of purchase must accompany return.

This warranty does not apply to products which have been damaged for any reason after leaving the control of Marshall, including, but not limited to damage caused by abuse, misuse, negligence, accident, modification, installation, alteration or repair, nor will Marshall be responsible for consequential damages. Marshall disclaims any implied warranty or warranties of any other nature other than as outlined above.

During the warrant period, if a product is found defective in material or workmanship, it will be replaced or repaired without charge if returned in accordance with the following instructions. The product should be packed carefully and returned, postal charges prepaid to: Marshall Gas Controls, 1000 Civic Center Loop, San Marcos, TX 78666. A note should be included advising the nature of the malfunction. Damage to the product incurred during packaging or shipping the product to Marshall Gas Controls is not covered under this warranty.

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