



Installation, Operation and Maintenance Instructions

TYPE-3500/3600 High Pressure Regulator

INTRODUCTION

Scope

This manual provides instructions for the installation, adjustment, maintenance, and parts ordering of all Type-3500 brass and Type-3600 316 Stainless Steel high-pressure regulators.

Description

The Type-3500/3600 regulators are self-operated, high-pressure regulators which can be designed to be used in applications requiring high-pressure reducing regulators for various gases. Type 3500/3600 regulators can also be used where high-pressure gas must be reduced for use as pilot supply pressure in pilot-operated regulators.

SPECIFICATIONS

Connections:

1/4" NPT (one inlet and two outlet connections)

Operating Temp.:

Type-3500: -70 to 225°F (-57 to 107°C)

Type-3600: -40 to 225°F (-40 to 107°C)

Max Inlet Pressure:

6000 psig

Outlet Ranges:

0-30 psi (0-2.0 bar)

0-60 psi (0-4.0 bar)

0-125 psi (0-8.6 bar)

0-150 psi (0-10.3 bar)

0-225 psi (0-15.5 bar)

Materials of Construction:

See Parts List

Flow Capacities (SCFH of 0.6 SG Gas)

| Inlet Pressure | Outlet Pressure | Outlet Range | | |
|----------------|-----------------|--------------|------------|------------|
| | | 0-120 psig | 0-150 psig | 0-225 psig |
| 250 | 20 | 700 | 1300 | - |
| | 40 | 120 | 400 | - |
| | 50 | 60 | 190 | 1300 |
| | 60 | - | 90 | 850 |
| | 80 | - | - | 400 |
| | 100 | - | - | 125 |
| 2000 | 115 | - | - | 40 |
| | 50 | 3200 | 7800 | - |
| | 60 | - | 1300 | - |
| | 85 | - | - | 10000 |
| | 100 | - | - | 2800 |
| | 115 | - | - | 500 |

INSTALLATION

WARNING: Over-pressuring a regulator or associated equipment may cause leakage, part damage, or personal injury due to bursting of pressure-containing parts or explosion of accumulated gas. Do not install a regulator where service conditions can exceed the specifications listed in this manual or the specifications of any applicable local, state, or Federal codes and regulations.

Use qualified personnel when installing, operating, and maintaining these regulators. Make sure that there is not damage to or foreign material in the regulator and that all tubing and piping are clean and unobstructed. The regulator may be installed in any position. Apply pipe compound to the pipeline threads. Connect inlet piping or tubing to the 1/4" NPT screwed connection marked "IN" and outlet piping or tubing to one of the 1/4" NPT screwed connections marked "OUT". Install a pressure gauge or pipe plug in the unused outlet connection.

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If continuous operation of the system is required during inspection or maintenance, install a three-valve bypass around the regulator.

WARNING: A regulator may vent some gas to the atmosphere. In hazardous gas service, vented gas may accumulate, causing personal injury or equipment damage due to fire or explosion. Vent a regulator in hazardous gas service to a remote, safe location.

The Type 3600 regulator is supplied with a 1/4" NPT female connection on the spring case for remote venting (tapped exhaust). To remotely vent the spring case, remove the screen, if present, and connect 1/4" piping or tubing to the spring case connection. The piping or tubing should (a) vent the spring case to a safe location, (b) have as few bends as possible, and (c) have a screened vent on its exhaust end.

STARTUP

With installation completed and downstream equipment adjusted, slowly open the upstream and downstream block valves while using pressure gauges to monitor pressure. To adjust, remove the adjusting screw cap and turn the adjusting screw clockwise to increase the set pressure or counterclockwise to decrease the set pressure. Monitor pressure with gauges during adjustment. When adjustment is complete, replace the adjusting screw cap. If the desired outlet pressure is not within the range of the regulator spring, install a spring with the desired range according to the "Maintenance" section.

SHUTDOWN

First, close the upstream shutoff valve, and then, close the downstream shutoff valve. Next, open the vent valve between the regulator and the downstream shutoff valve and open the vent valve between the regulator and the upstream shutoff valve. If vent valves are not installed, safely bleed off both inlet and outlet pressures and check that the regulator contains no pressure.

MAINTENANCE

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and parts replacement depends on the severity of service conditions and the requirements of local, state, and federal rules and regulations.

Instructions are given below for disassembly and assembly of parts.

WARNING: To avoid personal injury or equipment damage from sudden release of pressure or explosion of accumulated gas, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure from the regulator.

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DISASSEMBLY

The following procedure describes how to completely disassemble the regulator. When part replacement or inspection is required, complete only those steps necessary to accomplish the job.

1. Remove the adjusting screw cap.
2. Turn the adjusting screw counterclockwise to remove spring compression.
3. Remove the bottom housing, bottom housing seal, and tension spring.
4. Turn the adjusting screw clockwise until the seat block screw is exposed.
5. Unscrew the seat block screw from the yoke.
6. Remove the seat housing and seat body.
7. Turn the adjusting screw counterclockwise to remove spring compression.
8. Remove the bonnet screws and separate the bonnet from the body.
9. Remove the upper spring retainer and spring.
10. Unscrew the diaphragm locknut, and remove the diaphragm plate, the diaphragm, the diaphragm gasket, and the diaphragm washer.
11. Remove the yoke from the body.
12. Unscrew the supply nozzle. Examine seating edge of supply nozzle. Replace with a new part if worn or nicked.

ASSEMBLY

The procedure assumes that the regulator was completely disassembled. If not, start these instructions at the appropriate step.

1. Screw the supply nozzle into the regulator.
2. Insert the yoke into the regulator. The seat block has four valve discs, one on each side. Inspect the valve discs and select the one to be used. Insert the seat block and seat housing into the regulator and fasten to the yoke with the seat block screw.
3. Place the bottom housing seal in the seal pocket of the regulator body. Place the tension spring in the bottom housing, and thread it into the regulator.
4. Put the diaphragm gasket on the regulator body.
5. Place the diaphragm washer, the diaphragm, and the diaphragm plate on the yoke. Make sure the diaphragm convolutions are toward the spring and secure the parts by threading the diaphragm locknut onto the yoke.
6. Place the spring and upper spring retainer on the diaphragm plate.
7. Position the bonnet over the spring and on the regulator body. Orient the bonnet vent or vents as necessary. Insert the cap screws and tighten them only finger-tight.
8. Thread the adjusting screw into the bonnet just far enough to slightly compress the spring. Securely tighten the cap screws and refer to the "Startup" section for adjustment procedures.

LIMITED WARRANTY & DISCLAIMER

ControlAir, LLC products are warranted to be free from defects in materials and workmanship for a period of 18 months from the date of manufacture, provided said products are used according to ControlAir, LLC recommended usages. ControlAir, LLC's liability is limited to repair of, refund of purchase price paid for, or replacement in kind of, at ControlAir, LLC's sole option, any products proved defective. ControlAir, LLC reserves the right to discontinue manufacture of any products or change product materials, design or specifications without notice.

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Parts List

| ITEM | DESCRIPTION | MATERIAL – Type-3500 | MATERIAL – Type-3600 | QTY. |
|------|---------------------------------|----------------------|----------------------------|------|
| 1 | Body | Brass | 316 Stainless Steel | 1 |
| 2 | Bonnet | Brass | 316 Stainless Steel | 1 |
| 3 | Bottom Housing | Brass | 316 Stainless Steel | 1 |
| *4 | Diaphragm Plate | Steel | Steel | 1 |
| *5 | Diaphragm | 302 Stainless Steel | Monel 400 | 1 |
| *6 | Diaphragm Gasket | Nitrile | Fluorocarbon | 1 |
| 7 | Supply Nozzle | 316 Stainless Steel | 316 Stainless Steel | 1 |
| 8 | Spring Retainer | 316 Stainless Steel | Steel | 1 |
| 9 | Spring – 0-125 | 17-4 Stainless Steel | Stainless Steel | 1 |
| | Spring – 0-150 | | | |
| | Spring – 0-225 | | | |
| *10 | Seal Bottom Housing | PTFE | PTFE | 1 |
| *11 | Tension Spring | Zinc Plated Wire | MP35N | 1 |
| 12 | Hex Cap Screw .250-20UNF X .625 | Stainless Steel | Stainless Steel | 6 |
| *13 | Yoke | Brass | 316 Stainless Steel | 1 |
| 14 | Seat Housing | Brass | 316 Stainless Steel | 1 |
| 15 | Seat Block Screw | 316 Stainless Steel | 316 Stainless Steel | 1 |
| *16 | Seat Block | Brass/Nylon | 316 Stainless Steel / PTFE | 1 |
| *17 | Diaphragm Washer | PTFE | PTFE | 1 |
| *18 | Hex Nut .375-24 UNF | Steel – Zinc Plated | Stainless Steel | 1 |
| 19 | Inlet Screen | Stainless Steel | Stainless Steel | 1 |
| 20 | Cap | Brass | 316 Stainless Steel | 1 |
| 21 | Slot Head Adjusting Screw | Stainless Steel | Stainless Steel | 1 |
| 22 | Tee Handle Adjusting Screw | Brass | Stainless Steel | 1 |

*INCLUDED IN REPAIR KIT

| DESCRIPTION | PART NO. Type-3500 | PART NO. Type-3600 |
|-------------|--------------------|--------------------|
| Repair Kit | 449-871-084 | 449-871-142 |

