



# 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. Unscrew the seat block screw from the yoke.
5. Remove the seat housing and seat body.
6. Remove the bonnet screws and separate the bonnet from the body.
7. Remove the upper spring retainer and spring.
8. Unscrew the diaphragm locknut, and remove the diaphragm plate, the diaphragm, the diaphragm gasket, and the diaphragm washer.
9. Remove the yoke from the body.
10. 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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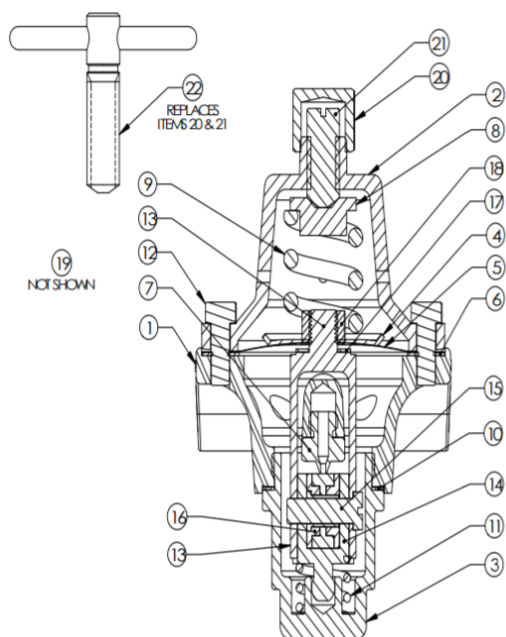
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### Parts List

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 / PCTFE	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



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