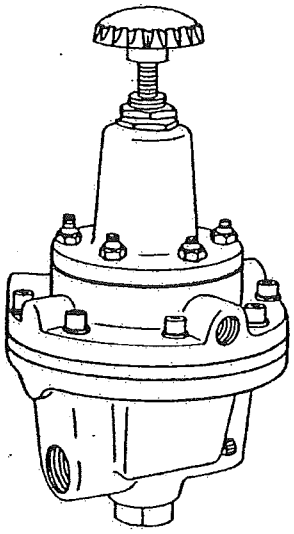
solartron mobrey

Solartron Mobrey GmbH	SERVICE INSTRUCTIONS MODEL 42 NULLMATIC PRESSURE REGULATORS



SECTION I – DESCRIPTION

GENERAL INFORMATION

The Model 42 Nullmatic Pressure Regulator utilizes the Null-balance principle, which holds the output pressure constant, regardless of wide changes in flow or supply pressure. Each regulator is in essence a self-contained pressure controller.

MODEL DESIGNATION

42 – 15

15 — Range (PSIG)

– — Options

- A - Air Loaded
- E - Pipe-tap exhaust
- – - Standard

42 — Basic Model Number

OPERATING CHARACTERISTICS*

Maximum flow capacity: 36 scfm * 61,1 Nm³/h

Effect of change from 0.5 scfm to max. flow: –0.10 psi

Effect of 25 psi increase in supply-dead end service: +0.09 psi

* Data based on tests of 30 psi range regulators set at 25 psi using 100 psi supply.

PRINCIPLE OF OPERATION (See Figure 1)

A fine-turn, precision screw is used to manually load the "range spring" which sets the regulated pressure. When the adjusting knob is turned clockwise, for example, the increased spring force is exerted on the "top diaphragm assembly" which decreases the "nozzle" clearance and increases the pilot pressure. The source for pilot pressure is supply air flowing to the "pilot pressure chamber" through the "restriction screw". The increased pilot pressure forces the "exhaust diaphragm assembly" downward, closing the "exhaust port", contacting and moving the "valve plunger" and thereby opening the "supply port". This increases the "regulated output" which also feeds back to the "top diaphragm assembly". The regulator locks-up or throttles at the new output valve when the feedback force of the "top diaphragm assembly" equals the "range spring force."

A safety release valve is incorporated in the top diaphragm assembly of the 15, 30 and 50 psi range models. The safety release operates if the regulated pressure becomes 3 to 15 psi more than the set pressure. It exhausts air through the atmospheric vent in the top housing. An overpressure causes the diaphragm to move upward, opening the safety release valve when the valve motion is stopped by the stripper plate.

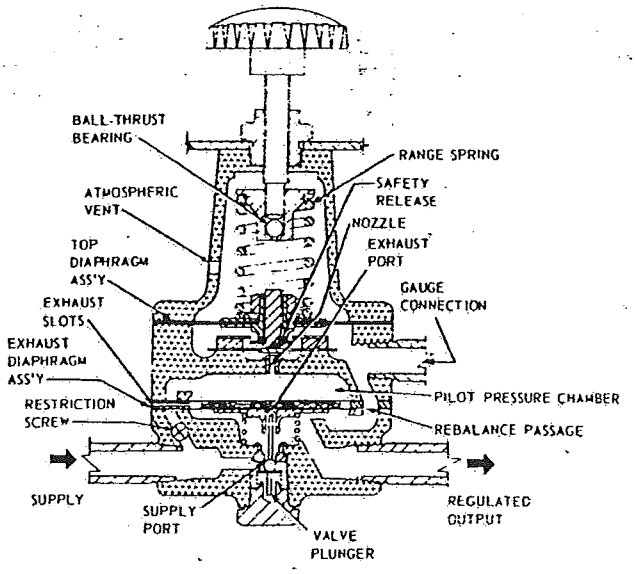


Figure 1 - Schematic

SECTION II – INSTALLATION

MOUNTING – Refer to Figures 2 and 3 or 4 for mounting dimensions, connections and configurations. The regulator can be mounted in any position without affecting its operation.

PIPING - Direction of flow through the regulator is shown by an arrow on the bottom casting. The supply and output connections in the casting are ½" N.P.T.

The ¼" N.P.T. connection in the center housing is for a pressure gauge. This will indicate regulated pressure at the regulator; it will not show the pressure drop in the downstream piping. Do not use the gauge tap for a flow connection.

SUPPLY AIR - Clean, dry, oil-free air should be used for the supply. If poor quality plant air is used, a filter should be installed in the supply line close to the regulator. This will remove scale and impurities and should virtually eliminate regulator maintenance.

Recommended and maximum supply pressures are given in the following table.

MODEL NO.	RANGE* psig	RECOMMENDED SUPPLY	MAXIMUM SUPPLY FOR BEST PERFORMANCE psig	MAXIMUM SUPPLY psig
42-15	0-15	10 psig greater	75	150
42-30	0-30	than the maximum	120	150
42-50	0-50	pressure to be	120	150
42-100	0-100	regulated	150	500
42-200	0-200		250	500

* The nominal minimum regulated pressure is 0 psig, but the actual minimum pressure will usually be from 0.5 to 2 psi depending on the model and supply pressure.

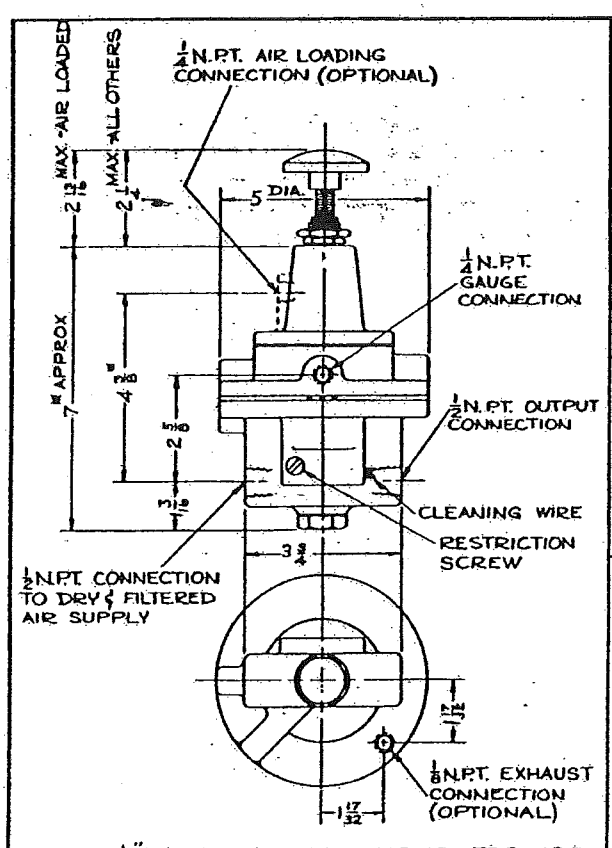


Figure 2 - Dimensions

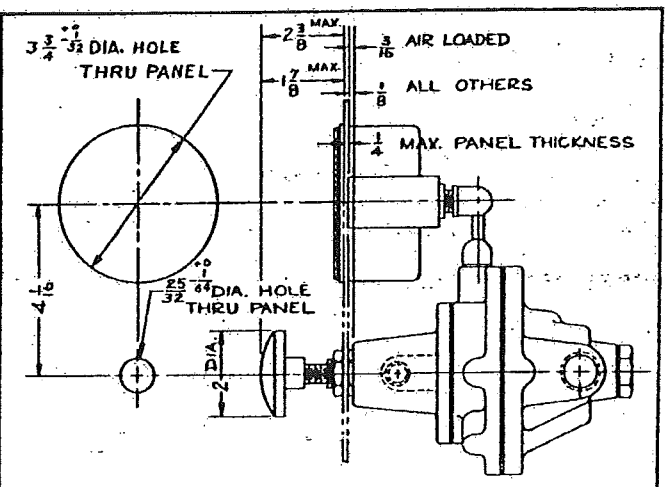


Figure 3 - Panel Mounted Regulator

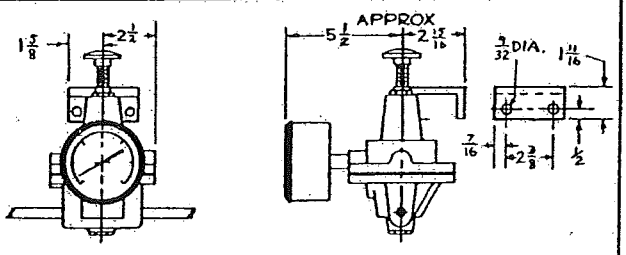


Figure 4 - Pipe or Bracket Mounted

SECTION III - MAINTENANCE

PREVENTATIVE MAINTENANCE

A clean, dry and oil-free supply air should be used. Providing an instrument air filter for the supply air system will prevent most difficulties arising from a dirty air supply. A periodic check of the filter element and regulator blow-down of the filter dripwell is recommended.

SERVICING

Lubrication - An occasional application of light grease to the adjusting screw threads and the screw-end socket will facilitate easy turning of the adjustment knob, especially in the high-pressure models.

Cleaning

Restriction Screw - To clean the restriction screw, turn off the supply air and remove the restriction screw from the bottom forging. Remove the knurled cleaning wire located near the output port and run it through the orifice at the tip of the restriction screw. In stubborn cases, the screw can be soaked in solvents to dissolve the blockage. Examine the "O" -ring for damage and cleanliness. When re-installing the restriction screw, tighten it securely.

Valve Plunger - To clean the valve plunger and its supply and exhaust seats, it must be removed from the regulator. Turn off the supply air and remove the retaining nut on the bottom forging. The valve plunger and plunger spring will drop out when this nut is removed, be careful not to lose them. The valve plunger must be clean on both the ball and tapered-end surfaces. If necessary, use a non-abrasive solvent. The supply and exhaust seats in the regulator must also be clean. The supply seat is readily accessible; the exhaust seat can be reached by using a tobacco pipe cleaner. Here again, use non-abrasive solvents. When re-installing, see the parts list for part orientation and tighten the retaining nut secrely.

DISASSEMBLY - Before disassembling, back-off the adjustment knob to relieve spring tension. Also, make a diagonal mark across all mating parts to provide easier alignment of parts during reassembly. Refer to the parts list, remove the body screws and disassemble the regulator.

ASSEMBLY - The exhaust diaphragm assembly and exhaust ring must be positioned so that none of the holes on the bottom forging are blocked. The three external holes on the exhaust ring line up under the gauge connection – See figure 2 for orientation with respect to the supply and output ports.

The center housing must be positioned to allow pilot and rebalance air to flow to the proper chambers; pilot air to the bottom cavity of the center housing and rebalance air to the top cavity. See figure 2 for orientation of the gauge connection with respect to the supply and output ports.

The nozzle seat assembly must be installed with its smooth finish seat facing down to the nozzle. The safety release valve (where applicable) must be positioned on the nozzle seat assembly before the stipper plate is installed. Centralize the nozzle seat assembly over the nozzle before tightening the retaining screws.

The top diaphragm assembly and the top casting can be located in any position. Generally, the nameplate on the casting lines up over the gauge connection.

SECTION IV – CHANGING RANGE

The range of any Model 42 Regulator may be changed by replacing the range spring, differential spring, the upper diaphragm assembly and other parts as noted in the parts list.

TROUBLE ANALYSIS

Symptom	Cause	Remedy
No output	No supply air	Turn on supply air.
	Clogged restriction screw.	Remove and clean
Output cannot be increased to full value.	Supply air setting too low.	Raise to recommended value.
	Valve plunger being held open on exhaust seat by a chip (pipe dope, Teflon tape, thread shaving, pipe scale, etc) Usually detected by a heavy exhaust.	Remove valve plunger and clean its seats.

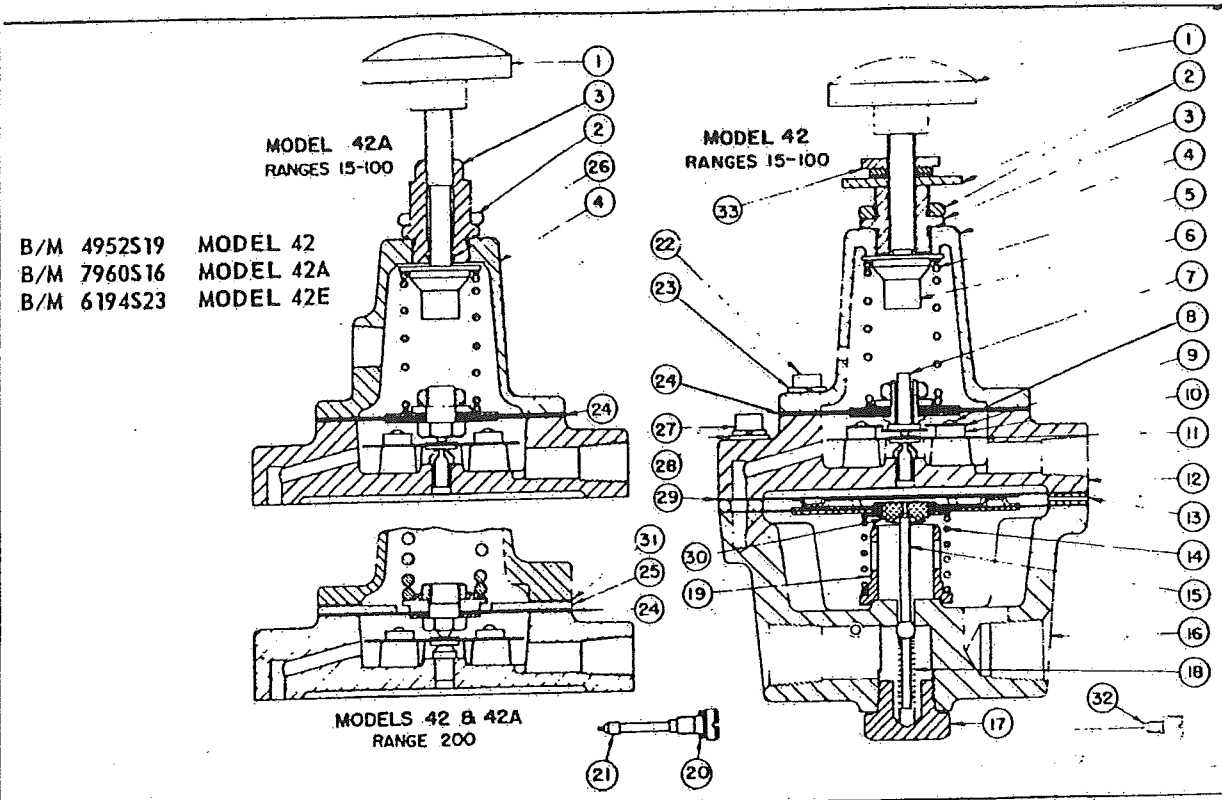
TROUBLE ANALYSIS (cont.)

Symptom	Cause	Remedy
Output cannot be increased to full value.	Clogged restriction screw	Remove and clean
Sluggish output response to increased setting.	Output flow exceeding specifications or excessive for supply air setting.	Raise supply pressure and/or consult factory.
	Partially clogged restriction screw.	Remove and clean
Output at full value, or more, and cannot be decreased.	Regulator piped backwards. Detected by an excessively heavy exhaust.	Re-pipe the regulator. Direction of flow is indicated by arrow on bottom forging.
	Loose restriction screw	Tighten securely
	External exhaust port blocked	Remove obstruction
	Internal exhaust port clogged	Remove valve plunger and clean exhaust seat port
Output cannot be decreased to minimum value.	Supply pressure too high	Reduce to recommended value
	Loose restriction screw	Tighten securely
	Valve plunger being held open on supply seat by a chip (pipe dope, Teflon tape, thread shaving, pipe scale, etc.)	Remove valve plunger and clean its seats.
	Heavy carbon or carbon/oil build-up on nozzle seat	Disassemble regulator and clean exhaust seat.
	Damaged supply seat	Install new bottom forging.
Exhaust from vent hole in top casting (Models 42-15, 42-30 and 42-50 only)	Same causes as "Output at full value, etc "	Same remedies as "Output at full value, etc"
	Dirty, misaligned or damaged safety release valve.	Disassemble regulator and repair safety release as required.

PARTS LIST

NULLMATIC PRESSURE REGULATORS—MODELS 42, 42A, 42E

From Drawing No. 4952-10



Item No.	Part No.	Description	Required 42 15 30 50	42 100	42 200	42A 15 30 50	42A 100	42A 200	42E 15 30 50	42E 100	42E 200
1a	1447-22	Adj. Screw and Knob Assy.	1	1	1	–	–	–	1	1	1
1b	3179-4	Adj. Screw and Knob Assy.	–	–	–	1	1	1	–	–	–
2a	1447-41	Locknut (Optional)	1	1	1	–	–	–	1	1	1
2b	3603-14	Mounting Nut	1	1	1	1	1	1	1	1	1
3a	2155-165	Bushing	1	1	1	–	–	–	1	1	1
3b	3494-4	Bushing	–	–	–	1	1	1	–	–	–
4a	2155-13	Top Casting	1	1	1	–	–	–	1	–	1
4b	4557-11	Top Casting	–	–	–	1	1	1	–	–	–
4c	3827-7	Top Casting	–	–	–	–	–	–	1	–	–
5a	572-37	Spring (Blue) (15 PSI)	1	–	–	1	–	–	1	–	–
5b	572-36	Spring (Red) (30 PSI)	1	–	–	1	–	–	1	–	–
5c	2155-22	Spring (Red-White) (50 PSI)	1	–	–	1	–	–	1	–	–
5d	2155-23	Spring (Green) (100 PSI)	–	1	–	–	1	–	–	1	–
5e	2155-90	Spring (Yellow-White) (200 PSI)	–	–	1	–	–	1	–	–	1
6	1447-24	Spring Seat	1	1	1	1	1	1	1	1	1
* 7	2155-62	Safety Release Valve Assy.	1	–	–	–	–	–	–	–	–
8	Screw	#4-40 x 3/8" Lg. Bind. Hd. Th'd. Cut. Stl.	2	2	2	2	2	2	2	2	2
9	572-19	Stripper Plate	1	–	–	–	–	–	–	–	–
* 10	1005-11	Spacer	2	2	2	2	2	2	2	2	2
11	1447-11	Nozzle Seat Assy.	1	1	1	1	1	1	1	1	1
12	4952-3	Center Casting Assy.	1	1	1	1	1	1	1	1	1
13a	7025-43	Exhaust Ring	1	1	–	1	1	–	–	–	–
13b	4952-56	Exhaust Ring	–	–	1	–	–	1	–	–	–
13c	6194-13	Exhaust Ring	–	–	–	–	–	–	1	1	–
13d	6194-15	Exhaust Ring	–	–	–	–	–	–	–	–	1
14a	1912-25	Differential Spring (Black)	1	–	–	1	1	1	1	–	–
14b	1912-53	Differential Spring (Green)	–	1	1	–	–	–	–	1	1
*15	1912-19	Valve Plunger Assy.	1	1	1	1	1	1	1	1	1
16a	4952-2	Bottom Forging	1	1	1	1	1	1	–	–	–
16b	4952-59	Bottom Forging	–	–	–	–	–	–	1	1	1
*17	1912-22	Retaining Nut	1	1	1	1	1	1	1	1	1
*18	1912-26	Valve Spring	1	1	1	1	1	1	1	1	1
19	4952-50	Stop Bushing	–	1	1	–	1	1	–	1	1
*20	2938-1	"O" Ring	1	1	1	1	1	1	1	1	1
*21	10792-10	Restriction Screw (Incl. Item 20)	1	1	1	1	1	1	1	1	1
22a	Screw	1/4-20 x 3/4" Lg. Fil. Hd. Stl. WNP	6	–	–	–	–	–	6	–	–
22b	Screw	1/4-20 x 1" Lg Fil. Hd. Stl. WNP	–	–	–	6	–	–	–	–	–
22c	4952-11	Stud	–	6	6	–	–	–	–	–	6
22d	4952-52	Stud	–	–	–	–	6	6	–	–	–
22e	6194-8	Stud	–	–	–	–	–	–	–	6	–
22f	Nut	1/4-20 Hex.	–	6	6	–	6	6	–	6	6
23	Lockwasher	1/4" Neverslip, Stl. WNP	14	14	14	14	14	14	14	14	14
*24a	2155-71	Top Diaphragm Assy.	1	–	–	–	–	–	–	–	–
*24b	1977-4	Top Diaphragm Assy.	–	1	–	1	1	–	1	1	–
*24c	3827-13	Top Diaphragm Assy.	–	–	1	–	–	1	–	–	1
25	2155-111	Diaphragm Ring	–	–	–	1	1	1	–	–	–
*26	2938-1	"O" Ring	–	–	–	1	1	1	–	–	–
27a	Screw	1/4-20 x 1" Lg. Fil. Hd. Stl. WNP	8	–	–	8	–	–	8	–	–
27b	Screw	1/4-20 x 1" Lg. Soc. Hd. Stl. WNP	–	8	8	–	8	8	–	8	8
28	118-36	Plain Washer	–	8	8	–	8	8	–	8	8
*29	1912-7	Diaphragm	1	1	1	1	1	1	1	1	1
*30	7025-39	Exhaust Diaphragm Assy.	1	1	1	1	1	1	1	1	1
*31	4557-4	Gasket	–	–	–	–	–	–	1	–	–
*32	1033-22	Cleaning Wire	1	1	1	1	1	1	1	1	1
33a	1977-16	Spacer (3/32" Thk.)	As Req'd			As Req'd			As Req'd		
33b	1977-20	Spacer (3/64" Thk.)									
33c	3603-5	Jam Nut									

* Recommended On-Hand Spare Parts. Always Specify Model Number and Serial Number of Instrument When Ordering Spare Parts.

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