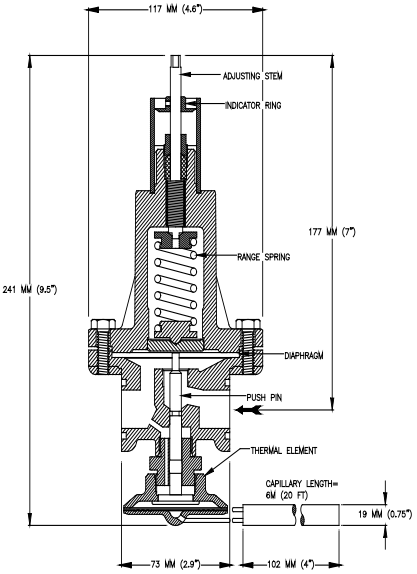
Compact Temperature Operated Regulators

Type A2AT, A2BT, A2B2T
For Ammonia, R-22, R-134a, R-404a, R-507 and other common refrigerants.
Features
Compact Direct Diaphragm Operated
Maximum Rated Pressure (MRP) 400 PSIG (27.6bar)
Flange Connections: FPT, SW, WN or ODS
Stainless Steel Diaphragm



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DESCRIPTION

The A2AT and A2BT temperature operated regulators are compact, direct diaphragm operated valves, for use with refrigerant liquid or vapor. The regulators can be used with ammonia, R-22, R-134a, R404a,R-507, certain other refrigerants, oil and other approved fluids with similar pressure, temperature and corrosion characteristics. The design pressure (MRP) is 400 psig (27.6 bar). This type of regulators isa used in systems where a small temperature operated regulator is needed, or as a remote pilot.

The regulators are furnished with flanges for FPT: Internal NPT (USA Standard Taper Pipe Thread), socket weld, weld neck or ODS (solders over copper tubing of given external diameter) connections. The regulator can be easily removed for service.

A strainer can be furnished to close couple to the inlet of the regulator.

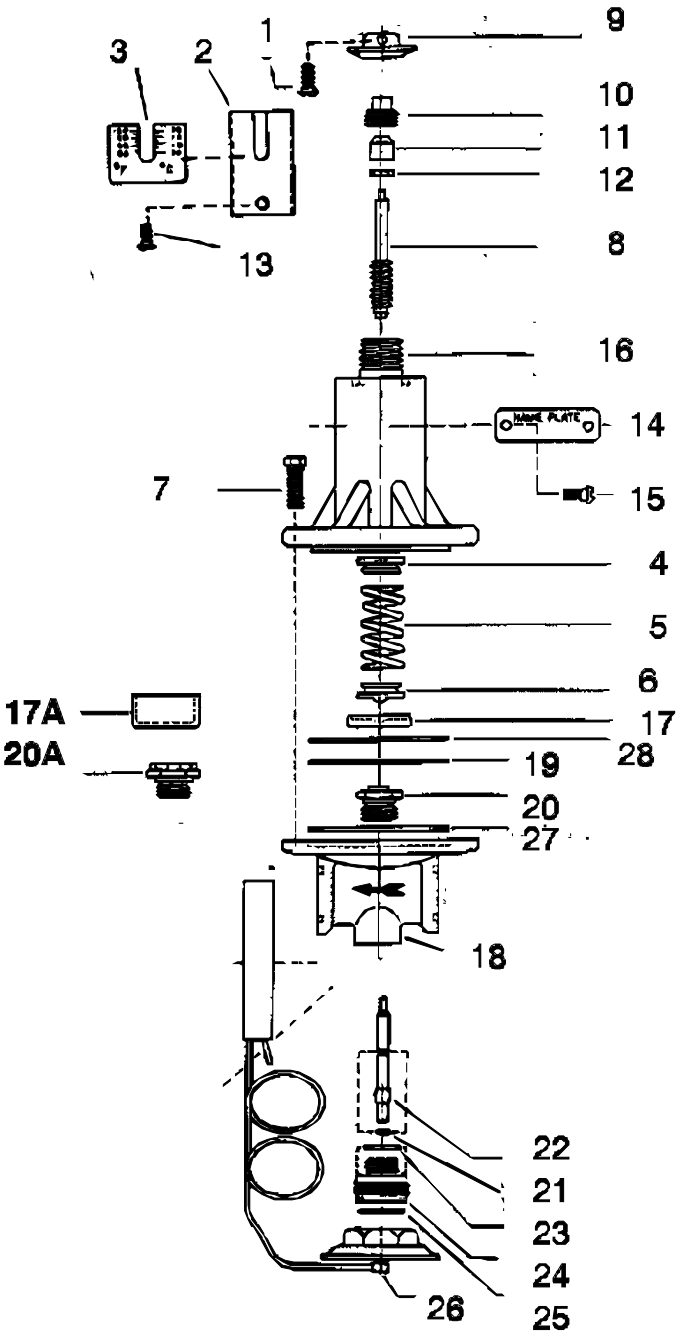
OPERATION

The A2AT and A2BT temperature operated regulator modulates flow in response to the temperature variation sensed by its thermal bulb. A rise in temperature will cause the valve to open; a drop will cause it to close. This valve responds only to temperature changes and is neither a pressure regulator, nor a thermostatic expansion valve.

Temperature changes of the cooled medium are sensed by the thermal bulb of the pilot. As the bulb is warmed the charge in the thermal element expands, creating an increase in pressure on the element diaphragm. The resulting force moves a push pin against the diaphragm lifting it off the seat, allowing flow of refrigerant. A drop in the temperature at the thermal bulb causes the opposite to happen, closing off the flow.

ADJUSTMENT

In addition to the pressure gauge at the inlet, a thermometer is needed in the cooled medium. Set the regulator scale to the desired temperature by turning the adjusting stem. The temperature scale is only approximate and minor adjustments will be necessary after the system has been in operation for a while to obtain the desired temperature setting. Standard Range is -20°F to 80°F (-30°C to +30°C). Also available: 60°F to 140°F (20°C to 60°C). The diaphragm of the thermal power element is limited to a differential of 425 psi. This corresponds to a bulb temperature of 155°F and zero pressure in the valve. The bulb temperature can exceed 155°F as long as the differential pressure across the power element diaphragm does not exceed 425 psi.



Item	Description
1	Indicator screw
2	Indicator collar
3	Indicator tag
4	Upper Spring Rest
5	Spring
6	Lower Spring Rest
7	Bonnet Screw
8	Adjusting stem
9	Indicator Ring
10	Stuffing Box Nut
11	Packing Ring
12	Packing Washer
13	Collar Screw
14	Nameplate
15	Screw
16	Bonnet
17	Diaphram Follower
18	Valve Body
19	Diaphram
20	Valve Seat
21	Push Pin O-ring
22	Push Pin
23	O-ring Adaptor
24	Adaptor
25	O-ring
26	Thermal Element
27	Gasket,Body
28	Gasket,Bonnet

Parts Kit Reference				
Item	Description	A2AT	A2BT	A2B2T
8,11,12	Stem Kit	202121		
4,5,6,28	Spring Kit RA	202481		
	Spring Kit RD	202482		
19,27,28	Diaphragm Kit	200775		
19,20,27,28	Seat Kit	202005	202001	202000
21(Qty 5)	O-ring kit	202485		
23,24,25,26	Element Kit	202088		

INSTALLATION - ALL A2 REGULATORS

Do not remove protective covering from the inlet and outlet of the regulator until the regulator is ready to be installed. Protect the inside of the regulator from moisture, dirt and chips before and during installation. When welded or brazed connections are used, all slag, scale, and loose particles should be removed from the flange interior before the regulator is installed between the flanges.

Tighten flange bolts and nuts evenly to provide proper seating of the flange gasket and to avoid damage to gasket or flanges. A close coupled companion strainer is available for installation at the inlet of the regulator to help protect it from most foreign material in the system.

The regulator must be installed with the arrow on the valve body pointing in the direction of the flow for the regulator to function properly. Backwards flow through the regulator is uncontrolled and will vary with the valve model, its setting and the reverse pressure drop encountered. The regulator should be installed in a location where it is easily accessible for adjustment and maintenance. The location should be such that the regulator can not be easily damaged by material handling equipment. Care should also be exercised when locating the temperature bulb and capillary tube to prevent damage to either part. The selection of the bulb location is important. It should follow generally accepted practices.

On installations where the bulb is strapped to a refrigerant line, the location of the bulb is at 12 o'clock for lines 1" outside diameter and smaller and 4 or 8 o'clock on larger lines. The pipe must be clean to assure good contact between bulb and line. On steel lines, it is recommended that some type of rust preventative method be used to minimize future corrosion. Finally, the bulb should be insulated to eliminate the effects of ambient air temperatures. If more sensitivity is desired, a bulb well is recommended. Do not locate the bulb in or near a trap in the line. Liquid refrigerant may accumulate at this point and feed an erroneous signal to the temperature bulb, causing erratic operation of the temperature regulator.
When it is necessary to insulate the regulator (and companion strainer), the insulation should be installed to provide access to the regulator (and companion strainer) for adjustment and maintenance. Proper indicating gauges should be installed to be easily visible to the operator adjusting the regulator.

TYPICAL APPLICATIONS

For oil cooling of Screw compressors, two methods may be used. One method involves locating the temperature bulb in the discharge gas of the compressor. The valve then maintains a constant discharge gas temperature byfeeding liquid refrigerant into the screws of the compressor. By maintaining a constant discharge temperature, a constant oil temperature is achieved.
A second method is to use and oil cooler with refrigerant as the cooling medium. The temperature bulb, located in the oil line to the oil cooler, senses temperature and feeds refrigerant to the oil cooler as needed. The refrigerant gas is then fed back into the suction side of the compressor.

With either method high and low temperature limit switches or other limiting devices may be appropriate as part of the total control system.

DISASSEMBLY AND ASSEMBLY

Before assembling or disassembling an A2 Regulator read the information in this bulletin and Bulletin RSB, Safety Procedures for R/S Refrigeration Control Valves.

Before a regulator is removed from the line or disassembled in the line, make sure that all refrigerant has been removed from the regulator and the regulator is isolated from the rest of the system in a safe manner.

Disassembly - Back out the adjusting stem 8 to remove all tension from the Range Spring 5. This is necessary to avoid possible damage to internal parts of the regulator. Remove Bonnet Screws 7 and disassemble parts. Normally parts 8 through 15 do not require disassembly. Inspect parts for dirt, corrosion and wear and clean or replace as needed. Inspect the Valve Seat 20 top seating surface for dirt, wear or damage. Remove from valve body and clean, lap on a flat plate or replace as necessary. Examine the diaphragm region which contacts the seat surface; look for dirt, heavy scratches or corrosion. If the diaphragm cannot be easily wiped clean, it should be replaced.

Check the movement of the push pin 22. If it does not move smoothly, the thermal element should be removed and the push pin, adapter, o-ring, and valve body cleaned thoroughly. Gaskets and "o" rings should be replaced whenever a regulator is re-assembled.

Assembly - When assembling the regulator, lightly oil the gaskets with refrigerant oil. Do not apply oil to the "o" rings because some oils may cause slight swelling and diameter increase. This does not affect the performance of the "o" rings, but it may make the assembly difficult.

Make sure all parts are free of dirt and moisture condensate. Dry the parts if necessary and oil slightly. All gaskets and "o" rings must be properly aligned. Assemble the parts making sure that the Diaphragm Follower 17 is properly located in the Bonnet 16. The diapragm must be installed with the raised center portion towards the bonnet. Make sure two diaphragms are used for Range 60°F to 140°F (20°C to 60°C). Tighten the Bonnet Screws 7 gradually and evenly. The screws should be tightened by turning opposingscrews alternately rather than in a circular pattern.

VALVE SELECTION

Valve selection depends on a critical analysis of the system. Many variables including pressure drop, amount of subcooling of liquid refrigerant, inlet pressure, amount of oil in refrigerant and general piping configurations affect the valve selection.

Any application of this valve must be confirmed by testing. Refrigerating Specialties is not responsible for system performance based on the data shown in its capacity table. The data presented is a theoretical capacity based on no flashing across the regulator. In actuality, the flow downstream of the regulator will be two-phase flow. The proportion of liquid and vapor will depend on the variables mentioned above.

WARRANTY

All Refrigerating Specialties products are warranted against defects in workmanship and materials for a period of one year from date of shipment from originating factory. This warranty is in force only when products are properly installed, field assembled, maintained and operated in use and service as specifically stated in Refrigerating Specialties Catalogs or Bulletins for normal refrigeration applications, unless otherwise approved in writing by Refrigerating Specialties Company. Defective products, or parts thereof returned to the factory with transportation charges prepaid and found to be defective by factory inspection will be replaced or repaired at Refrigerating Specialties option, free of charge F.O.B. factory. Warranty does not cover products which have been altered, or repaired in the field; damaged in transit, accidents, misuse, or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

The express warranty above constitutes the only warranty of Refrigerating Specialties products, and is in lieu of all other warranties, expressed or implied, written or oral, including any warranty of merchantability or warranty of fitness for a particular purpose and in noevent is Refrigerating Specialties responsible for any consequential damages of any nature whatsoever. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Refrigerating Specialties nor to assume for Refrigerating Specialties any other liability in connection with any of it products.

Safe Operation (See also Bulletin RSB)

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the Refrigerating Specialties Division valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent Refrigerating Specialties Division product Bulletins and Safety Bulletin RSB prior to installation or servicing work.

Where cold refrigerant liquid lines are used, it is necessary that certain precautions be taken to avoid damage which could result from liquid expansion. Temperature increase in a piping section full of solid liquid will cause high pressure due to the expanding liquid which can possibly rupture a gasket, pipe or valve. All hand valves isolating such sections should be marked, warning against accidental closing, and must never be installed upstream of solenoid valves, or regulators with electric shut-off, nor should hand valve upstream of solenoid be close until the liquid has been removed. It is advisable to properly install relief devices in any section where liquid expansion could take place.

Avoid all piping or control arrangements which might produce thermal or pressure shock. For the protection of people and products, all refrigerant must be removed from the section to be worked on before a valve, strainer, or other device is opened or removed.

Flanges with ODS connections are not suitable for amm onia service.

Bolt Torque Table		
Item	Port size	Torque
7/16” Flange Bolt	1/2”	28ft lb
5/16” - 18 bonnet bolt	3/4” - 4”	11 ft lb