LESLIE CONTROLS, INC.
A subsidiary of CIRCOR International, Inc.
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INSTALLATION, OPERATING,
AND MAINTENANCE INSTRUCTIONS
PARTS LIST

60/1.5.1
Rev. 3

DIRECT OPERATED, SMALL FLOW TEMPERATURE REGULATORS

CLASSES M, MK, MR, MRK, MC-2, MD-2, ME-2, MCR-1 & MDR-1

TABLE OF CONTENTS

CLASSES

HEATING SERVICE		COOLING SERVICE	
MC-2 M	M	CR-1	MR
MD-2	MK	MDR-1	MRK
ME-2			

Any of the above classes, when fitted with a calibrated dial,will have such fitting indicated by the addition of C to the basic class designation, i.e. MCC-2, MKC etc.

PROPOSED MAINTENANCE	CLASS	FOLLOW STEPS
To replace Thermostatic Element	All	Installation Steps 6 and 7
To inspect or to replace Main Valve or Seat	MC-2, MD-2 ME-2	"A" Steps 1 thru 3
	MCR-1, MDR-1	"A" Steps 4 thru 7
	M, MK, MR MRK	"A" Steps 8 thru 7
To replace Stem Packing	MC-2, MD-2 ME-2 M, MR, MK MRK	"B" Steps 1 thru 7
	MCR-1 MDR-1	"B" Steps 1, 2 & 8 thru 10
To Reassemble	MC-2, MD-2 ME-2	"C" Steps 1 thru 3
	MCR-1 MDR-1	"C" Steps 1 thru 3
	M, MK	"C" Steps 6 thru 10
	MR, MRK	"C" Steps 11 thru 15

For regulators with calibrated dials follow procedures shown in IV in addition to those noted above.

SECTION I
INSTALLATION

Follow normal installation sketches shown on page 1 of this instruction. Do not use red lead or cement in making up joints. Use pipe compound sparingly on male threads only.

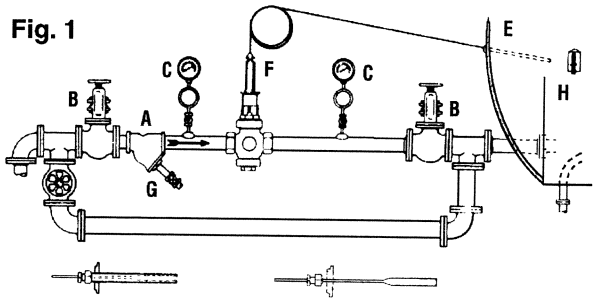
1. Install a self-cleaning strainer with a blow off stop valve (A) to protect the regulator from scale and other foreign matter.

2. Install stop valves (B) before and after regulator. To provide for maintenance, without the need for shutting down the heater or process, include a by-pass in piping arrangement. Provide an inlet pressure gauge and also an outlet gauge, (C) wherever there is need for an accurate indication of coil or healer pressure, as in the case of shell and tube heaters.

3. Blow out pipe lines thoroughly before installing regulator.

4. Install regulator (F) (without thermostatic element)in the inlet supply line to the equipment, with arrow (cast on side of body) pointing in direction of fluid flow. Although regulator may be installed in any position for heating service the inverted position is preferred for cooling service for 3/4" and 1" sizes.

Fig. 1

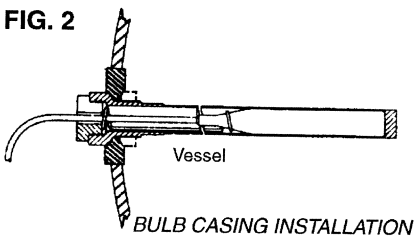


TYPICAL INSTALLATION

5. Place the bulb casing or stuffing box in a position in the vessel, that will insure contact of the thermostatic bulb with true temperature of the fluid under control. (See typical installation sketches). *Do not locate thermostatic bulb in a position that will bring it any closer than 6" to a source of heat or coolant.* Where direct injection method of heating or cooling is being used, *DO NOT* place thermostatic bulb in direct path of heating or cooling medium.

6. *Assembling thermostatic element and adjusting sleeve to the regulator.* See Fig. 1.

FIG. 2



BULB CASING INSTALLATION

BULB CASING INSTALLATION

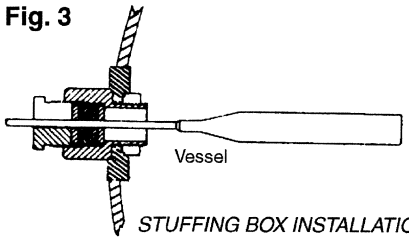
Remove adjusting sleeve (F) from the regulator. Slide internal threaded end carefully over bellows of the thermostatic element and screw on to threads of swivel nut until end of adjusting sleeve rests on swivel nut face. Tighten swivel nut firmly against adjusting sleeve. Note:: These parts should be kept tightly joined together so that whenever an adjustment for temperature is made the adjusting sleeve and bellows will move as a unit, thereby maintaining their relative positions.

Replace the adjusting sleeve (with thermostatic element attached) in bonnet of regulator and screw it a few turns into bonnet threads. Lock in place with locknut.

Insert thermostatic bulb and spring in bulb casing Fig. 2. Assemble bulb casing nut to bulb casing and tighten in place. Note: For installations using stuffing boxes instead of bulb casings follow instructions immediately below.

Installations Using Stuffing Boxes

Fig. 3



STUFFING BOX INSTALLATION

Disassemble stuffing box assembly by removing stuffing box nut, top split washer, the two pieces of packing and the bottom split washer.

Install stuffing box in vessel as described in Step 5.

Insert thermostatic bulb into vessel through the stuffing box, making sure that the capillary tubing is straight in the area of the stuffing box and that it is positioned in the center of the box in order that parts may be assembled freely.

Spread one split washer and assemble it around the capillary tubing. Push split washer down into stuffing box until it rests on bottom of box. Follow with the two packing rings (with openings on opposite sides) and the other split washer. Position stuffing box nut on the capillary tubing. Insert threaded end into the stuffing box and tighten down against the packing.

Note: Handle capillary tubing carefully and arrange its location for maximum protection. Thermometer (H) and thermostatic bulb (E) should be located in the same area for accurate check of the regulator action.

8. *Injection Heating:* For injection heating, place regulator above maximum level in the vessel. Install check valve on outlet side of regulator to prevent water from backing up into the regulator. In a closed vessel delivered steam pressure must always exceed the water pressure.

9. Cooling Service: In cooling service a small constant circulation of coolant may be desirable and should be provided by a small by-pass around the regulator (needle valve type by-pass valve).

SECTION II - OPERATION

HEATING SERVICE REGULATORS CLASSES MC-2, MD-2, ME-2, M and MK; and similar classes fitted with calibrated dials.

1. Slowly open the inlet stop valve and dispose of condensation, foreign matter, etc. by opening the strainer blow-off valve.

2. Slowly open outlet stop valve permitting steam to enter vessel.

3. At start up the regulator will be wide open and heating will be rapid. As desired temperature is approached, loosen locknut and turn adjusting sleeve into bonnet until regulator just closes at desired temperature. Tighten locknut. For regulators fitted with calibrated dial see figure 9.

4. Check desired temperature after a period of operation and, if necessary, readjust adjusting sleeve to obtain exact desired temperature. To increase temperature setting gradually turn adjusting sleeve out of bonnet until regulator maintains desired temperature. To decrease temperature turn adjusting sleeve into bonnet.

5. To turn steam off close inlet stop valve.

COOLING SERVICE REGULATORS CLASSES MCR-I, MDR-I, MR, MRK and Classes fitted with calibrated dials and/or constant flow bleed orifice

6. Slowly open inlet stop valve and dispose of scale or other accumulated foreign matter, by opening the strainer blow-off valve.

7. Screw the adjusting sleeve all the way into bonnet in order to open the regulator fully. Open the outlet stop valve to permit flow of coolant to vessel.

8. Observe temperature of fluid being cooled and, when desired temperature is approached, back adjusting sleeve out of bonnet until regulator throttles and just closes at desired temperature. For adjustment of regulators with calibrated dials see figure 9.

9. Check temperature after a period of operation and,if necessary, reset adjusting sleeve to obtain the exact temperature desired. To increase temperature setting gradually turn adjusting sleeve out of bonnet until regulator maintains desired temperature. To decrease temperature turn adjusting sleeve into bonnet.

10. To turn coolant flow off close inlet stop valve.

SECTION III - MAINTENANCE

Refer to proper drawing and parts list

A. Dismantling

Note. For dismantling bonnet assembly follow procedure shown under — Replacing Valve Stem Packing.

CLASSES MC-2, MD-2, ME-2 and similar types fitted with calibrated dials. Refer to proper Drawing, and Parts List.

1. Loosen locknut (7). Remove adjusting sleeve (1) and thermostatic element (20) from bonnet(10).

2. Loosen and remove bonnet assembly and bonnet .gasket (26) from main body (15).

3. Lift out ball (27)(main valve). If removal of seat ring (14) is necessary, insert a correctly sized piece of flat stock between lugs of seat ring and loosen seat ring by turning flat stock with a suitable wrench. Unscrew seat ring and remove from main body.

CLASSES MCR-I, MDR-1 and similar types fitted with calibrated dials. Refer to proper Drawing and Parts List.

4. Loosen locknut (7). Remove adjusting sleeve (1) and thermostatic element (20) from bonnet (10).

5. Remove springs and spring seats as shown in "Replacing Valve Stem Seal".

6. Loosen and remove bottom cap (19) and bottom cap gasket (28). Push valve stem downward through bonnet until valve disc clears bottom end of main body (15). Grasp valve disc and draw it and valve stem from bonnet and main body. Loosen bonnet (10) and remove it and bonnet gasket (26) from main body.

7. 1f removal of seat ring (14) is necessary proceed as shown in Step 3 above, Classes MC-2, etc.

CLASSES M, MK and similar types fitted with calibrated dials. Refer to proper Drawing and Parts List.

Note: All parts used in Classes M, MR, MK and MRK are the same and the valve action (for heating or cooling service) is determined by the way in which the regulator parts are assembled. (See Assembly procedure Section).

8. Loosen locknut (7). Remove adjusting sleeve (1) and thermostatic element (20) from bonnet (10).

9. Loosen and remove bonnet assembly from main body (15).

10. *CLASSES M and MK*

Fig. 4

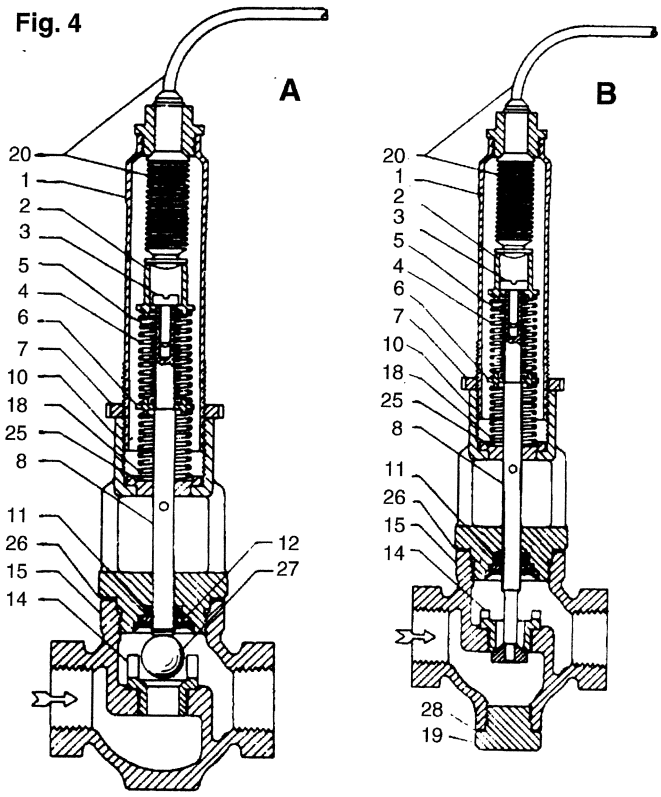
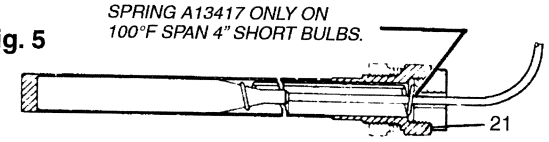


FIG. 4A- CLASS MC-2, MD-2, & ME-2
FIG. 4B- CLASS MCR-1, MDR-1

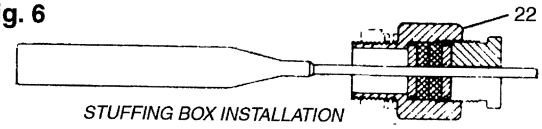
See table on page 11 for Parts Identification

Fig. 5



BULB CASING INSTALLATION

Fig. 6



STUFFING BOX INSTALLATION

Lift out bellows-main valve assembly as a unit. This assembly consists of:- bellows and dischholder (l7), main valve disc (16), main valve stem (13) and two "O" rings (23). For directions concerning this assembly see Step 14 below. Remove cap (19) and main valve spring (18).

CLASSES MR and MRK

11. Loosen and remove cap (19) and main valve spring (18). Follow instructions under Step 3 immediately above for handling bellows-main valve assembly.

12. Disassembly of Bellows-Main Valve Assembly

Figure 7A

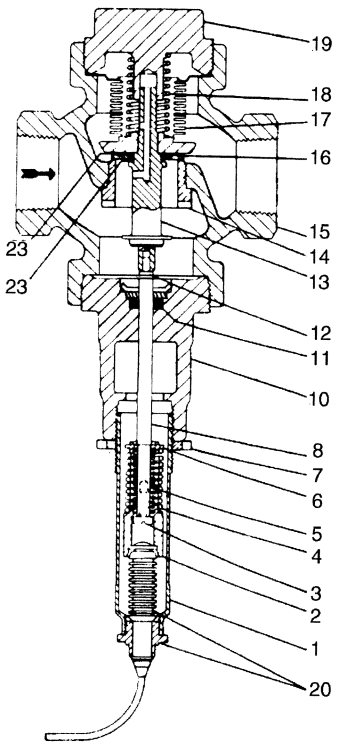


Figure 7B

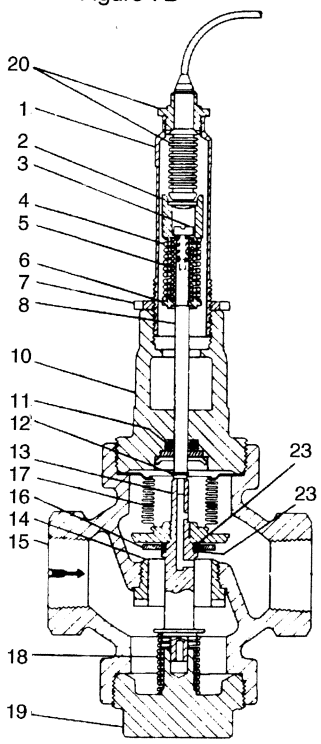


FIG. 7A CLASS MR, & MRK (COOLING SERVICE)
FIG.7B CLASS M, & MK (HEATING SERVICE)

See table on page 11 for Parts Identification

Note: Exercise care in handling bellows-main valve assembly in order to protect the bellows and valve disc from damage.

Place a closely fitting wrench across the flats of disc holder (Disc Holder and Bellows are permanently attached to each other and comprise part (17). Place another wrench on flats provided on main valve stem (13) and loosen parts.

Separate bellows and disc holder complete (17) from main valve stem (13), main valve disc (16) and the two "O" rings (23).

CLEANING AND REASSEMBLY OF BELLOWS-MAIN VALVE ASSEMBLY

13. Immediately following dismantling of the bellows-main valve assembly clean all of its parts thoroughly, replace those worn or damaged and reassemble as shown above.

Note: If main valve disc (16) is worn on the side which has been in contact with fluid, it may be reversed in reassembling in order to take advantage of unworn side. If both sides have been worn, main valve disc can be lapped to remove wear marks. Lap on lapping plate or trued surface plate. Use mild lapping compound and make sure main valve disc is held square with plate during lapping operation.

14. Place "O" Ring (23) on main valve stem (13) (threaded end of main valve stem) and move it along stem until it is positioned on large shoulder beyond the threads. Place main valve disc (16) on top of first "O" ring (23). Moisten second "O" ring (23) and slide it over main valve stem (13). Move it along stem until it clears the threads and rests on the main valve disc (16). Line up "O" rings and main valve disc to be concentric with shoulder at end of threads.

15. Hold main valve stem in a straight vertical position and screw disc holder end of bellows and disc holder assembly (17) on to main valve stem (13). Using wrenches on flats provided on disc holder and main valve stem tighten assembly until firm metal to metal lock is felt.

CAUTION

Leslie Regulators are ruggedly built, dimensioned very accurately and carefully assembled. Do Not change any dimensions.

To assure best performance, long life and low maintenance cost use only Standard Leslie Parts.

Handle the capillary tubing carefully. Do Not use graphite or compound on the joints. Moving parts require no lubricant.

16. Cleaning

Clean all parts with an approved solvent, except "O" rings, which should only be wiped clean with a dry rag. Use crocus cloth to remove any encrusted material except on Teflon coated valve stem. After using solvent,dry parts and blow off all traces of dust or other foreign matter.

REPLACEMENT OF PARTS

Seat Ring

If seat ring has been removed as described in Step 3, MC-2 above, replace as follows, using new seat ring if necessary.

Make sure that all contacting faces of seat ring and main body are clean and in good condition. Insert seat ring threads into body seat ring threads and screw seat ring down until contacting faces meet. Use flat stock and wrench described in removal operation to tighten seat ring. In the case of the larger M, MR, MK and MRK regulators use the special wrench provided. Tighten seat ring firmly but do not distort.

MCR- 1 and MDR- 1 may be lapped in for dead end operation with a very fine lapping compound. Use bonnet

for guide when lapping and remove all traces of lapping compound when operation is completed.

B. Replacing Valve Stem Seal

Classes MC-2, MD-2. ,ME-2, M, MK, MR and MRK

1. Loosen locknut (7). Remove adjusting sleeve (1) and thermostatic element (20) from bonnet (10).

2. Place pin in hole provided in valve stem (8). Remove valve stem screw (3) thereby freeing yielding springs inner (5) and outer (4), top spring seat (2) and intermediate spring seat (6) and valve spring (18). Note: In the case of Classes M, MK, MR and MRK the valve springs are contained within the main body. As valve stem screw (3) clears the valve stem (8) hold spring seat and springs to prevent them from jumping away. Remove bottom spring seat (25). This part is also eliminated from regulators which have the valve spring in the main body assembly.

3. Remove bonnet (10) and bonnet gasket (26) from main body (15). Slide valve stem (8) out of the bonnet. Remove old stem seal per instruction 4 and Fig. 8. Clean all parts thoroughly. Do not scratch or mar Teflon coating.

4. At this point renew any worn or damaged part. Replace valve stem (8) in bonnet (10).

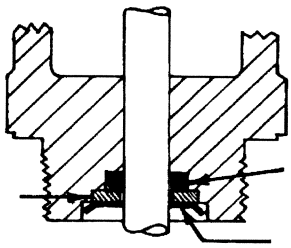


Fig. 8
Stem Seal
M Class

To remove "O" ring seal (11) take out lockring (42) and gland ring (41), then"O" ring.

To install "O" ring seal moisten "O" ring with lubricant and place in counterbore in bonnet. Insert gland ring in its recess in bonnet then press lockring in place (firmly against gland ring) and with prongs positioned as shown in Fig.8.

5. Assemble bonnet gasket (26) and bonnet (10) with assembled parts to main body (15). Tighten in place. Slide bottom spring seat (25) (where used) over valve stem (8) making sure that raised face end points toward opening provided for it in bottom of spring chamber. Move down over stem until it seats on contacting face.

6. Place short (valve) spring (18) (where used) on bottom spring seat (25). Follow with the intermediate spring seat (6) and the yielding springs, inner (5) and outer (4). Note: The two yielding springs must always be in the top position.

7. Place pin in hole provided in valve stem (8) to hold valve stem from turning when tightening valve stem screw. Position top spring seat (2), (with deep end opposite springs) on springs. Insert valve stem screw (3). Press top spring seat (2) down tightly against springs, compressing them until valve stem screw can be easily run into valve stem threads. Tighten firmly.

8. Follow Steps "1" and "2" to remove parts from bonnet assembly.

CLASSES MCR-1, MDR-1

9. Loosen and remove bottom cap (19) and bottom cap gasket (28). Push valve stem down through bonnet until valve disc clears bottom of main body (15). Valve stem and main valve disc are integral. Grasp main valve disc and draw it and valve stem from bonnet and main body. Remove bonnet from main body. Replace Stem Seal as shown in Fig. 8.

10. Insert valve stem (8) through main body (15) and into position in bonnet (10). Reassemble bonnet parts as shown in Steps "4" through "7". Replace bottom cap gasket (28) and bottom cap (19). Tighten.

C. Reassembly

CLASSES MC-2, MD-2, ME-2 and similar type fitted with calibrated dials. Refer to proper Drawing and Parts List.

1. Place ball (main valve)(27) in seat ring (14).

2. Position bonnet gasket (26) on main body (15). Assemble bonnet assembly (reassembled according to instructions under "Replacing Stem Seal") to main body and turn into body threads until gasket face contracts bonnet gasket. Tighten.

3. Reassemble adjusting sleeve (1) and thermostatic element (20) to bonnet (10) as shown under "Installation Step 6. Adjust for desired temperature setting as shown under "Operation".

CLASSES MCR-1, MDR-1

4. For Classes MCR-1, and MDR-1 place bonnet gasket (26) on main body (15). Assemble bonnet to main body and turn into body threads until it contacts the gasket. Tighten.

5. For balance of reassembly follow directions contained in Step 10 under "Maintenance," "Replacing stem seal". Procedure is the same.

CLASSES M, MK, MR, MRK and similar classes fitted with calibrated dials. See proper Drawing.

Note: Classes M and MK are temperature regulators for heating service; Classes MR and MRK are temperature regulators for cooling service. Parts are the same in all classes with the exception of body and bonnet materials. *The manner in which the parts are assembled determine valve action, that is whether the valve opens or closes on an increase in temperature; For Heating Service valve should close on an increase in temperature; For cooling Service valve should open on an increase in temperature.*

Instruction Plates (Marked "Cap on this end for Heating Service" and "Cap on this end for Cooling Service") are attached to opposite sides of the main body indicating correct method of assembling for the particular service desired.

CLASSES M AND MK (Heating Service)

6. In Classes M and MK the position of Cap (19) will be on the end of main body (15) marked for "Heating Service".

7. Insert bellows-main valve assembly [with main valve stem (13) passing through seat ring(l4)] into end of main body *opposite* that marked for "Heating Service". Cap (19) goes into the other end of main body.

8. Install bonnet assembly in main body (15) in the following manner:

   Remove adjusting sleeve (1) from the bonnet (10). Push valve stem (8) through bonnet (10) against spring compression until intermediate spring seat (6) bottoms in bonnet. Insert tip at lower end of valve stem (8) in hole in upper end of main valve stem (13) (In this case bel-lows end). Permit bonnet (10) to slide along valve stem (8) until it contacts threads in main body.

9. Screw bonnet (10) into main body (15) and tighten down against bellows flange. Place main valve spring on Cap (19) and screw into end of main body (15) marked for "Heating Service" and tighten.

10. Replace locknut (7), adjusting sleeve (1) and thermostatic element (20).

CLASSES MR AND MRK (Cooling Service)

11. In Classes MR and MRK the position of Cap (19) will be on the end of main body (15) marked for" Cooling Service".

12. Insert bellows-main valve assembly [with main valve stem (13) through seat ring (14)] into end of main body (15) marked for "Cooling Service". Place main valve spring (18) inside bellows and position it on disc holder. Screw Cap (19) into main body threads and tighten down against bellows flange.

13. Install bonnet assembly in main body (15) in the manner shown immediately above for Classes M and MK, Step 3. In this case "hole in upper end of main valve stem(l3)"will refer to end of main valve stem opposite the bellows.

14. Insert bonnet assembly into threads in the opposite end of main body and tighten down against body face.

15. Insert adjusting sleeve (1) and thermostatic element in bonnet (20) and adjust for desired temperature setting as shown under "Operation".

In all cases, after steam or water has been turned on, recheck tightness of packing gland. Tighten just enough to seal against leakage.

CALIBRATED DIAL ASSEMBLIES

Any of the regulators above may be fitted with a calibrated dial assembly for changing the temperature setting at will. Such regulators are indicated by the inclusion of "C" in the class designations: for instance. Class MCC-2, MDC-2, etc. Particular instructions for these can be ordered from the factory.

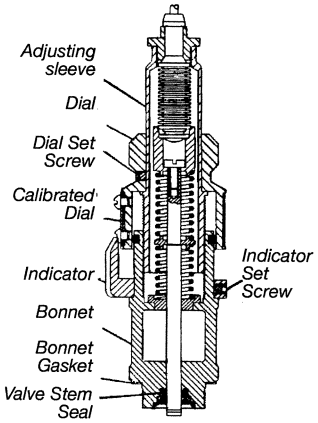


FIG. 9

CALIBRATED DIAL ASSEMBLY

Replacing Packing

1. Loosen indicator setscrew.Turn adjusting sleeve, dial, and thermostatic element assembly out of bonnet. Make sure that swivel nut turns freely so that capillary tubing will not twist. As dial turns it will be noted that a certain amount of drag is present. This drag is normal and is caused by the presence of a dry "O" ring in bonnet. "O" ring is purposely assembled dry in order to cause enough friction to prevent movement of dial from setpoint in the event that vibration exists in the equipment. DO NOT lubricate this "O" ring.

2. To replace stem seal follow instructions "Replacing Stem Seal."

FIELD CONVERSION from plain bonnet assembly to Calibrated Dial Assembly

CLASSES MC-2, MD-2, ME-2, M, MR, MK, MRK.

Remove plain bonnet assembly from the regulator.

Replace with calibrated dial bonnet assembly. Adjust as shown below.

CLASSES MCR I AND MDR-1

Remove plain bonnet assembly from main body. To do this follow instructions under Maintenance,"Replacing Stem Seal". Dismantling and reassembling of this type bonnet assembly will be the same as shown for MCR- 1and MDR-1 after removal of the adjusting sleeve and calibrated dial assembly from the new bonnet.

After reassembly adjust as shown below.

Adjustment of Dial assembly for Varying Temperature at will.

Calibrated Dial Assemblies are fitted with calibrated dials, for the particular thermostatic element in use, which will provide a temperature scale equal to the full range of the element with one complete turn of the dial.

Adjusting for Temperature Setting

a. Loosen indicator setscrew and dial setscrew with Allen head setscrew. wrench.

b. Move indicator to position convenient for reading dial. Heat equipment up to lowest temperature point indicated on dial. To do this follow instructions under "Operation". Lock dial set-screw. Move indicator to position where pointer will correspond to this temperature setting. Lock indicator setscrew. Dial will now be free to make one full turn from minimum setting of element range to maximum.

c. From minimum temperature setting turning adjusting sleeve and dial clockwise decreases temperature; turning it counterclockwise increases temperature.

The Following Calibrated Dials are available.

Temperature Range	*Ref. Number*
20-120°F*	A21932
50-150°F	A21933
(1)	A20724
120-170°F	A22788
(2)	A20302
170-220°	A22789
170-270°F	A21931
220-270°F	A20303
20-70°F	A45422
30-230°F	A46489
70-120°F	A40285
70-170°F	A34931
-7-19°C*	A50260
Blank	A35591

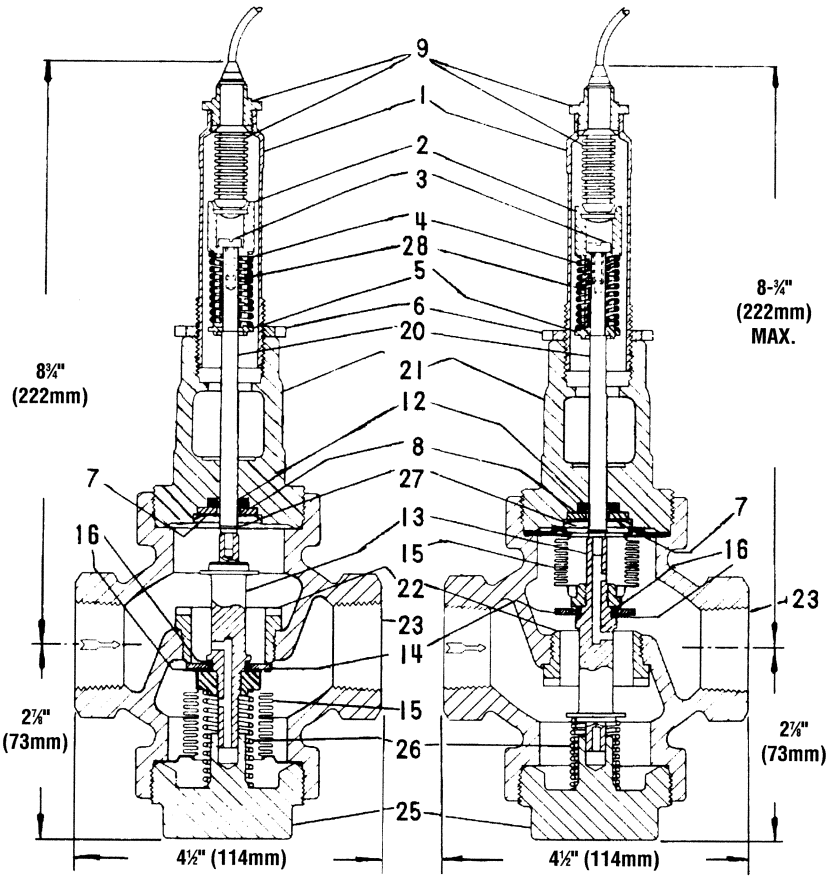
(1) Dual calibrated 50-250°F and 10-121°C.
(2) Dual calibrated 120-220°F and 49-104°C.

*Equivalent.

NOTES:

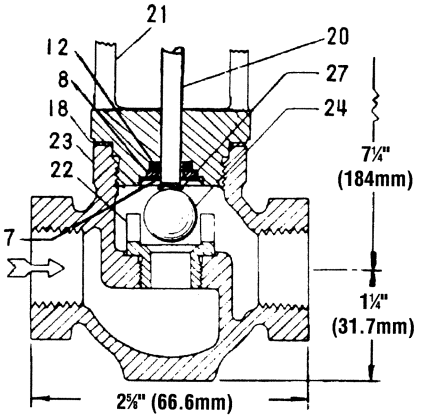
DIRECT OPERATED, SMALL FLOW TEMPERATURE REGULATORS

CLASSES M, MK, MR, MRK, MC-2, MD-2, ME-2, MCR-1, & MDR-1



VIEW SHOWING CLASSES 3/4" & 1" MR AND MRK COOLING SERVICE

VIEW SHOWING CLASSES 3/4" & 1" M AND MK HEATING SERVICE



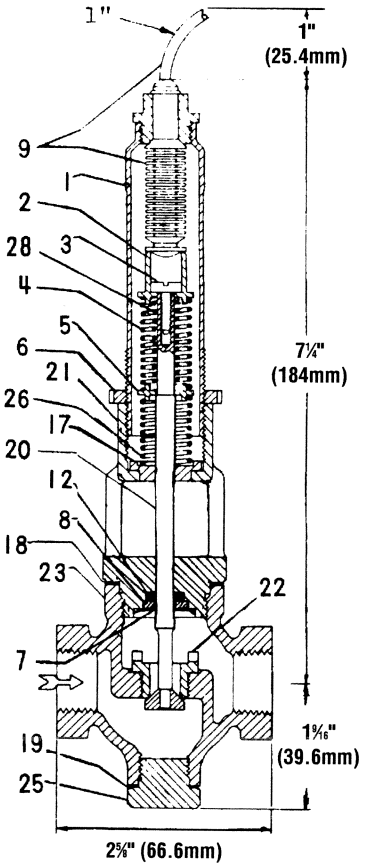
VIEW SHOWING CLASSES 1/2" MC-2, MD-2 & ME-2 OTHER PARTS SAME AS MCR-1

Table of Standard Temperature Ranges For Thermo-Elements
50 Range Span
70 - 120°F. 120 - 170°F. 170 - 220°F. 220 - 270°F.
100 Range Span
20 - 120°F. 50 - 150°F. 70 - 170°F. 120 - 220°F. 170 - 270°F.
200 Range Span
50 - 250°F.

When ordering Replacement Thermo-Elements, include class of Temperature Regulator, Range, Material, Special Coating if required and Tubing Length. See Engr. Data Sheets 60/0.3.6 & 60/0.3.7 for all Thermo-Elements

Approximate Net Wt. for Classes M, MK, MR and MRK is 8 lb. (3.6 kg)
Approximate Net Wt. for Classes MC-2, MD-2, MCR-1 and MDR-1 is 2 lb. (.9 kg)

SEE REVERSE SIDE FOR PART NAME AND PART REFERENCE NUMBER

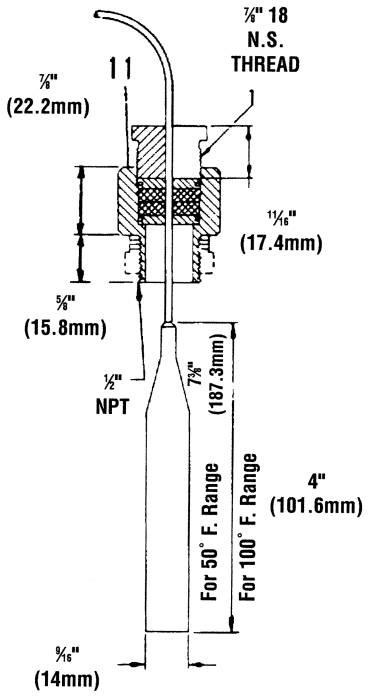


VIEW SHOWING CLASSES 1/2" MCR-1 & MDR-1

WHEN ORDERING PARTS, GIVE SIZE, CLASS, PART NAME AND PART REFERENCE NUMBER FROM TABLE BELOW. USE PART NUMBER ONLY TO LOCATE PART ON DRAWING.

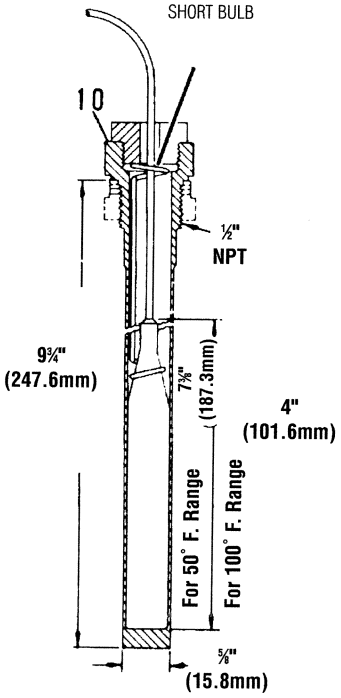
PART NO.	PART NAME	MATERIAL	REF. NO.
1	Adjusting Sleeve	Stainless Steel	13340
2	Top Spring Seat	Brass	13351
3	Valve Stem Screw	Brass	13354
4	Yielding Spring, Outer	Spring Steel, Plated	13356
5	Intermediate Spring Seat	Brass	13350
6	Lock Nut	Cast Bronze	13353
7	Washer	Steel	57894
8	Gland Ring	Brass	57842
9	Thermo-Element - See Engr Data Sheets 60/0.3.6 & 60/0.3.7		
10	#3 Bulb Casing Complete, Thick Wall Installation	Brass	13434
10	#3 Bulb Casing Complete, Thin Wall Installation	Brass	13435
11	Stuffing Box Complete, Thick Wall Installation	Brass	13436
11	Stuffing Box Complete, Thin Wall Installation	Brass	13437
* 12	O-Ring	Synthetic Rubber	55364-95
13	Main Valve Stem (M, MK, MR & MRK)	Stainless Steel	34965
14	M. Valve Disc (M, MK, MR & MRK)	Stainless Steel	36252
15	Bellows & Disc Holder Complete (M, MK, MR & MRK)	Monel	36251
* 16	O-Ring (M, MK, MR & MRK)	Hi-Temp. Elastomer	42352-93
17	B. Spring Seat (MCR-1 & MDR-1)	Brass	13349
* 18	B. Gasket (MD-2, ME-2, MCR-1 & MDR-1)	Copper	3492
* 19	Bottom Cap Gasket (MCR-1 & MDR-1)	Copper	13355
20	Stem (M, MK, MR & MRK)	Stainless Steel	36250
20	Stem (MC-2 & MD-2)	Stainless Steel	15003
20	Stem (ME-2)	Stainless Steel	15004
20	Stem (MCR-1 & MDR-1)	Stainless Steel	13393
21	Bonnet, (M, MK, MR & MRK) NOTE 1	Cast Bronze	36248
21	Bonnet, (MC-2, MD-2, ME-2, MCR-1 & MDR-1) NOTE 1	Cast Bronze	35631
22	Seat Ring (M, MK, MR & MRK)	Stainless Steel	34966
22	Seat Ring (MCR-1)	Stainless Steel	13397
22	Seat Ring (MDR-1)	Stainless Steel	13398
22	Seat Ring (MC-2)	Stainless Steel	15001
22	Seat Ring (MD-2)	Stainless Steel	14999
22	Seat Ring (ME-2)	Stainless Steel	15000
23	Main Body, Screwed, 3/4 (M & MR)	Cast Bronze	40559
23	Main Body, Screwed, 3/4 (MK & MRK)	Cast Iron	40779
23	Main Body, Screwed, 1/2 (MC-2, MD-2 & ME-2)	Cast Bronze	66186
23	Main Body, Screwed, 1/2 (MCR-1 & MDR-1)	Cast Bronze	13335
23	Main body, Screwed, 1 (M & MR)	Cast Bronze	36247
23	Main Body, Screwed, 1 (MK & MRK)	Cast Iron	40780
24	Ball (MC-2)	Stainless Steel	15090
24	Ball (MD-2)	Stainless Steel	15089
24	Ball (ME-2)	Stainless Steel	15088
25	Cap (M, MK, MR & MRK)	Cast Bronze	36249
25	Cap (MCR-1 & MDR-1)	Brass	13352
26	Valve Spring, (M, MK, MR, & MRK)	Stainless Steel	34964
26	Valve Spring, (MCR-1 & MDR-1)	Steel, Nickel Plated	13358
27	S. Clip (M, MK, MR, MRK, MC-2, MD-2 & ME-2)	Stainless Steel	15002
28	Yielding Spring Inner	Spring Steel, Plated	13357

NOTE 1 - Bonnet is furnished complete with Part No. 7, Washer; Part No. 8, Gland Ring and Part No. 12, O-Ring.



STANDARD STUFFING BOX INSTALLATION

SPRING A13417 ONLY ON 100° SPAN 4" SHORT BULB



For Complete List of Bulb Casings see Drawing No. 60/0.4.1.2

STANDARD BULB CASING INSTALLATION

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