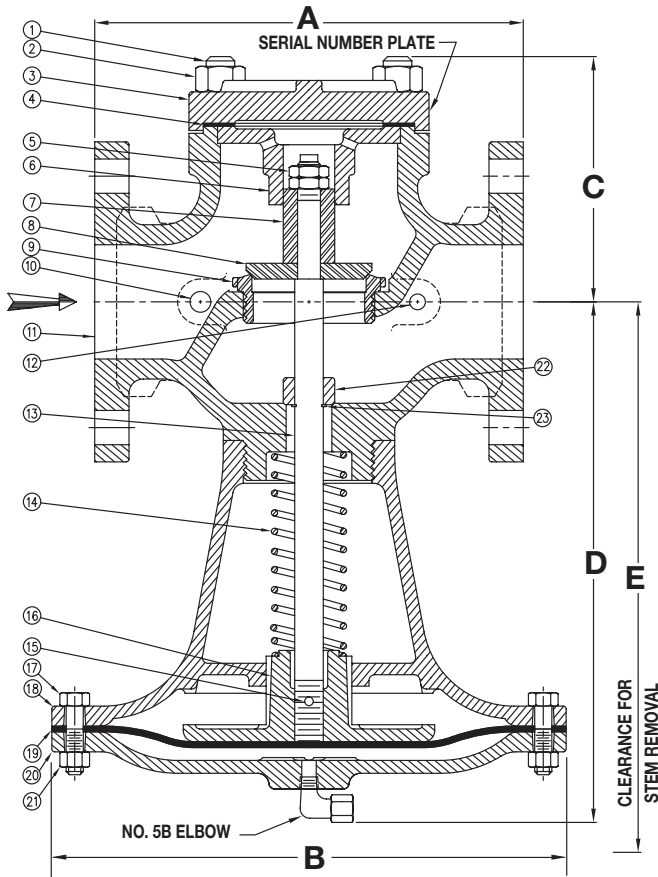




A subsidiary of CIRCOR International, Inc.

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SD 3002B/0802



TYPE E2 MAIN VALVE

TYPE E2 Main Valve Sizes 3/4" through 10"

The Spence Type E2 Main Valve is of normally closed, single seat design featuring packless construction, Hycar diaphragm and protected main spring.

When controlled by one or more of the various types of Spence Pilots, this valve will accomplish most functions required of a regulator.

CAST IRON RATINGS (Maximum Inlet Conditions)

Valve Ends Pressure (Temperature)

- ANSI NPT Screwed15 PSIG(250°F)
- ANSI 125 Flanged15 PSIG(250°F)

DIMENSIONS (inches), WEIGHTS (pounds) AND RATED FLOW COEFFICIENTS (Cv)

| SIZE | A | | OTHER DIMENSIONS | | | | APPROX. WT. | | Cv |
|-------|-------------|-------------|------------------|--------|--------|--------|-------------|-------------|------|
| | CI ANSI NPT | CI ANSI 125 | B | C | D | E | CI ANSI NPT | CI ANSI 125 | |
| 3/4 | 4 3/4 | — | 8 | 2 7/8 | 7 3/4 | 11 1/2 | 18 | — | 7.6 |
| 1 | 5 3/8 | 5 1/2 | 8 | 3 5/8 | 8 1/8 | 12 1/2 | 19 | 21 | 11.7 |
| 1 1/4 | 6 1/2 | 6 3/4 | 9 | 4 1/8 | 8 1/4 | 12 1/2 | 30 | 33 | 18.9 |
| 1 1/2 | 7 1/4 | 6 7/8 | 9 3/4 | 4 3/8 | 8 3/4 | 13 1/4 | 36 | 40 | 27.4 |
| 2 | 7 1/2 | 8 1/2 | 10 1/2 | 5 1/4 | 10 | 15 1/4 | 50 | 57 | 44 |
| 2 1/2 | — | 9 3/8 | 10 1/2 | 5 3/4 | 11 1/2 | 17 3/4 | — | 70 | 68 |
| 3 | — | 10 | 11 1/4 | 6 5/8 | 12 3/4 | 19 3/4 | — | 98 | 96 |
| 4 | — | 11 7/8 | 13 1/2 | 6 3/4 | 13 5/8 | 21 1/4 | — | 135 | 143 |
| 5 | — | 13 5/8 | 14 1/4 | 7 1/2 | 15 | 23 | — | 185 | 202 |
| 6 | — | 15 1/8 | 16 | 7 7/8 | 16 5/8 | 26 | — | 250 | 255 |
| 8 | — | 19 | 20 | 9 1/2 | 19 7/8 | 30 1/2 | — | 415 | 465 |
| 10 | — | 23 5/8 | 24 | 10 7/8 | 23 7/8 | 38 1/2 | — | 690 | 748 |

PRINTED IN U.S.A.

OPERATING PRINCIPLE

The regulator is operated by initial steam or fluid pressure. It is normally closed, being held so by initial pressure on the disc and by an internal main spring. When the pilot is opened (see pilot instructions), initial pressure flows through the pilot to the 8B tee. Bleedport 4A restricts the flow and pressure builds under the diaphragm and opens the main valve.

Delivery pressure feeds back through the control pipe to the pilot diaphragm. As this pressure approaches a balance with the thrust of the adjusting spring, the pilot throttles the loading pressure. In turn, the main valve takes a position established by the loading pressure where just enough steam flows to maintain the set delivery pressure.

MAINTENANCE

INSPECTION

Under normal conditions, complete dismantling at regular intervals is not recommended. A valve kept relatively free of dirt will function for years with minimum attention.

After the first few days of operation and twice a year, the following should be checked.

1. Inspect for dirt collected at bleedport No. 4A.
2. Inspect all joints for leakage. Keep bolts tight. Never allow a leak to persist.

DISMANTLING MAIN VALVE

Connect a source of air or water pressure which can be adjusted by hand to the No. 5B elbow. Apply pressure to jack valve open and prevent stem from turning while removing stem nuts. Usually 30 psi will suffice. Use penetrating oil on the threads.

REPLACING SEAT RINGS

These joints should be made up with Copaltite, Permatex or equal high temperature gasket compound. Remove old compound from body and seat ring with a wire brush. Apply new compound sparingly to both parts, threads and shoulders. Let stand until tacky before assembling.

GRINDING IN

Seats and discs should never require more than the lightest touch up with very fine (400 grit) grinding compound. Heavy grinding will produce galling, wider seating surface and a groove in the disc, all of which tend to cause leakage. Reface a damaged surface before attempting to grind it in. Grind sparingly.

Main stem (13) is slotted for rotation with a screwdriver. Valve spring (14) is omitted from the assembly during grinding. Slip the stem into its normal position. Apply compound to the disc, place it on the stem and guide plug, tighten with stem nut.

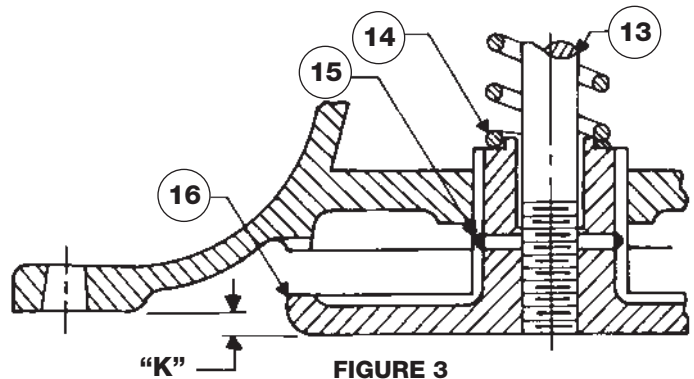
After grinding, disassemble and clean all parts.

VALVE SETTING

| VALVE SIZE | TYPE E2 | |
|------------|----------|-------|
| | HOOD (K) | TOTAL |
| 3/4 | 1/8 | 1/4 |
| 1 | 3/16 | 5/16 |
| 1¼ | 7/32 | 3/8 |
| 1½ | 1/4 | 7/16 |
| 2 | 9/32 | 9/16 |
| 2½ | 11/32 | 11/16 |
| 3 | 13/32 | 13/16 |
| 4 | 15/32 | 15/16 |
| 5 | 17/32 | 1½ |
| 6 | 19/32 | 1½ |
| 8 | 25/32 | 1½ |
| 10 | 31/32 | 1½ |

Valve setting is gaged at K to establish correct stem length and diaphragm position. Dimension K is supplied with each replacement stem.

To install new stem (13), fasten disc (8) and guide plug firmly on stem with stem nut. Insert stem and disc assembly in valve and screw on pressure plate (16). Omit spring (14) for this operation. Hold disc on seat and adjust position of pressure plate until valve setting K is reached. Push pressure plate against stops in base (18). Remove disc, drop out pressure plate and stem, drill and insert dowel pin (15) to lock the joint. Grind off stem projection flush with face of pressure plate.



START-UP AND SETTING

On pressure reducing valves like the E2D, use by-pass to fill the delivery system and raise pressure to slightly below normal required. Close pilot by releasing compression on adjusting spring. See Figure 2. Open 1/4" control pipe valve. Crack outlet stop valve. Crack inlet stop valve. Blow down strainer. **Caution: Never open a reducing valve without positive indication that the high side is clear of condensate.**

Open inlet stop valve and gradually compress adjusting spring until the valve opens and takes control at desired pressure. Alternately choke down on the by-pass and open outlet stop valve until the regulator is on the line. See individual instructions for other pilots.

TROUBLE SHOOTING

FAILURE TO OPEN OR SAGGING DELIVERY PRESSURE

1. Adjusting spring on pilot may have been tampered with.
2. Initial pressure may be down due to partially closed supply valve, clogged strainer or other obstruction.
3. No. 4A bleedport fitting may have been omitted and an open coupling substituted.
4. Control pipe may be plugged. Most likely points of obstruction are at shutoff valve and entrance to delivery main.
5. Main diaphragm may be broken. Test with air or water before dismantling.

FAILURE TO CLOSE OR OVER-RIDING DELIVERY PRESSURE

1. Adjusting spring on pilot may have been tampered with.
2. Orifice in bleedport No. 4A may be plugged.

3. By-pass valve may be leaking.

4. On pressure regulators like the E2D, the main valve or pilot may be held open by foreign matter in seat. To determine which valve leaks, first close inlet stop valve and 1/4" control pipe valve. Then remove bleedport bend so pilot will exhaust to atmosphere. Crack inlet stop valve. Steam will issue from No. 8B tee. Release compression on adjusting spring to see if pilot closes tight. Open and close several times to wash seat. Steam blowing back from bleedport means main valve disc is held open by foreign matter. Steam may wash the obstruction from the seat if the valve is made to open wide. This can be accomplished, even at light loads, if the control point is beyond the outlet stop valve. Reassemble bleedport bend and place regulator in operation. Then, slowly open and close outlet stop valve.

CAST IRON PARTS LIST – 3/4" to 3"

| ITEM NO. | PART NAME | MATERIAL | VALVE SIZE | | | | | | |
|----------|-------------------|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 |
| 1 | Blind Flange Stud | Steel | 05-05518-00 | 04-10118-00 | 05-05507-00 | 04-05443-00 | 04-10119-00 | 04-10119-00 | 04-05443-00 |
| 2 | Blind Flange Nut | Steel | 05-02847-00 | 05-02851-00 | 05-02854-00 | 05-02856-00 | 05-02860-00 | 04-02860-00 | 05-02856-00 |
| 3 | Blind Flange | Cast Iron | 04-02171-00 | 04-02173-00 | 04-02176-00 | 04-02178-00 | 04-02180-00 | 04-02185-00 | 04-02157-00 |
| 4 | *Gasket | Non-Asbestos | 05-02381-01 | 05-02362-01 | 05-02382-01 | 05-02365-01 | 05-02366-01 | 05-02367-01 | 05-02369-01 |
| 5 | *Stem Nut | Steel | 05-02969-00 | 05-02970-00 | 05-02970-00 | 05-02971-00 | 05-02971-00 | 05-02972-00 | 05-02973-00 |
| 6 | Disc Guide Plate | Cast Iron | 04-03576-00 | 04-03479-00 | 04-03480-00 | 04-03478-00 | 04-03500-00 | 04-03509-00 | 04-03496-00 |
| 7 | Guide Plug | Stainless Steel | — | — | — | 04-03751-01 | 04-03750-00 | 04-03754-00 | 04-03755-00 |
| 8 | *Integral Disc | Stainless Steel | 04-01813-02 | 04-01832-02 | 04-01850-02 | 04-01870-02 | 04-01888-02 | 04-01906-01 | 04-01918-00 |
| 9 | *Seat Ring | Stainless Steel | 04-04075-01 | 04-04084-01 | 04-04092-01 | 04-04496-01 | 04-11593-00 | 04-11650-00 | 04-11549-00 |
| 10 | Pipe Plug 1/4" | Steel | 04-03772-00 | 04-03772-00 | 04-03772-00 | 04-03772-00 | 04-03772-00 | 04-03772-00 | 04-03772-00 |
| 11 | NPT Body | Cast Iron | — | — | — | — | — | — | — |
| | 125 Body | Cast Iron | — | — | — | — | — | — | — |
| 12 | Pipe Plug 1/8" | Steel | 04-03769-00 | 04-03769-00 | 04-03769-00 | 04-03769-00 | 04-03769-00 | 04-03769-00 | 04-03769-00 |
| 13 | *Stem | Stainless Steel | 04-05241-02 | 04-05254-02 | 04-05254-02 | 04-05325-01 | 04-05247-02 | 04-05324-02 | 04-05394-03 |
| 14 | *Main Spring | Steel | 05-05093-02 | 05-05093-02 | 05-05094-01 | 05-05095-01 | 05-05096-01 | 05-05097-01 | 05-05098-01 |
| 15 | *Groove Pin | Steel | 05-03247-00 | 05-03247-00 | 05-03247-00 | 05-03251-00 | 05-03251-00 | 05-03253-00 | 05-03254-00 |
| 16 | *Pressure Plate | Cast Iron | 04-03621-00 | 04-03700-00 | 04-03622-00 | 04-03623-01 | 04-03624-00 | 04-03625-00 | 04-03626-00 |
| 17 | Diaphragm Bolt | Steel | 05-04770-00 | 05-04770-00 | 05-04773-00 | 05-04773-00 | 05-04773-00 | 04-04773-00 | 05-04774-00 |
| 18 | Base | Cast Iron | — | — | — | — | — | — | — |
| 19 | *Diaphragm | Hycar | 05-01668-00 | 05-01668-00 | 05-01669-00 | 05-01670-00 | 05-01671-00 | 05-01672-00 | 05-01673-00 |
| 20 | Hood | Cast Iron | 04-02571-00 | 04-02571-00 | 04-02605-00 | 04-02606-00 | 04-02607-00 | 04-02608-00 | 04-02648-00 |
| 21 | Diaphragm Nut | Steel | 05-02872-00 | 05-02872-00 | 05-02874-00 | 05-02874-00 | 05-02874-00 | 05-02874-00 | 05-02874-00 |
| 22 | Stem Washer | Stainless Steel | 04-06130-00 | 04-06131-00 | 04-10048-00 | 04-06132-00 | 04-12291-00 | 04-06248-00 | 04-06249-00 |
| 23 | Retaining Ring | Stainless Steel | 05-09382-00 | 05-09383-00 | 05-09383-00 | 05-09384-00 | 05-09392-00 | 05-09385-00 | 05-09386-00 |
| 24 | Top Flange | Cast Iron | 04-02246-00 | 04-02248-00 | 04-02250-00 | 04-02252-00 | 04-02233-00 | 04-02259-00 | 04-02261-00 |
| | Repair Kit | | 08-07940-00 | 08-07941-00 | 08-07942-00 | 08-07943-00 | 08-07944-01 | 08-07945-01 | 08-07946-01 |

*These parts furnished in Repair Kit

CAST IRON PARTS LIST – 4" to 10"

| ITEM NO. | PART NAME | MATERIAL | VALVE SIZE | | | | |
|----------|-------------------|-----------------|-------------|-------------|-------------|-------------|-------------|
| | | | 4 | 5 | 6 | 8 | 10 |
| 1 | Blind Flange Stud | Steel | 04-05443-00 | 04-10119-00 | 04-10120-00 | 04-10120-00 | 04-10120-00 |
| 2 | Blind Flange Nut | Steel | 05-02856-00 | 05-02860-00 | 05-02860-00 | 05-02860-00 | 05-02860-00 |
| 3 | Blind Flange | Cast Iron | 04-02157-00 | 04-02158-00 | 04-02162-00 | 04-02165-00 | 04-02167-00 |
| 4 | *Gasket | Non-Asbestos | 05-02369-01 | 05-02371-01 | 05-02397-01 | 05-02374-01 | 05-02375-01 |
| 5 | *Stem Nut | Steel | 05-02973-00 | 05-02947-00 | 04-02975-00 | 04-02976-00 | 04-02977-00 |
| 6 | Disk Guide Plate | Cast Iron | 04-03496-00 | 04-03504-00 | 04-03473-00 | 04-03474-00 | 04-03497-00 |
| 7 | Guide Plug | Stainless Steel | 04-03756-00 | 04-03757-00 | 04-03742-00 | 04-03743-00 | 04-03744-00 |
| 8 | *Integral Disc | Stainless Steel | 04-01922-00 | 04-01931-00 | 04-01940-00 | 04-01995-00 | 04-01951-00 |
| 9 | *Seat Ring | Stainless Steel | 04-11759-00 | 04-11666-00 | 04-15802-00 | 07-43794-00 | 04-15803-00 |
| 10 | Pipe Plug 1/4" | Steel | 04-03772-00 | 04-03772-00 | 04-03772-00 | 04-03772-00 | 04-03772-00 |
| 11 | 125 Body | Cast Iron | — | — | — | — | — |
| 12 | Pipe Plug 1/8" | Steel | 04-03769-00 | 04-03769-00 | 04-03769-00 | 04-03769-00 | 04-03769-00 |
| 13 | *Stem | Stainless Steel | 04-05266-02 | 04-05268-02 | 04-05269-02 | 04-05273-02 | 04-05272-01 |
| 14 | *Main Spring | Steel | 05-05099-01 | 05-05100-01 | 05-05101-01 | 05-05102-01 | 05-05103-01 |
| 15 | *Groove Pin | Steel | 05-03256-00 | 05-03257-00 | 05-03259-00 | 05-03260-00 | 05-03262-00 |
| 16 | *Pressure Plate | Cast Iron | 04-03627-00 | 04-03628-00 | 04-03629-00 | 04-03630-00 | 04-03631-00 |
| 17 | Diaphragm Bolt | Steel | 05-04774-00 | 05-04775-00 | 05-04780-00 | 05-04780-00 | 05-04782-00 |
| 18 | Base | Cast Iron | — | — | — | — | — |
| 19 | *Diaphragm | Hycar | 05-01674-00 | 05-01675-00 | 05-01676-00 | 05-01677-00 | 04-01678-00 |
| 20 | Hood | Cast Iron | 04-02609-00 | 04-02618-00 | 04-02610-00 | 04-02611-00 | 04-02612-00 |
| 21 | Diaphragm Nut | Steel | 05-02874-00 | 05-02874-00 | 05-02877-00 | 05-02877-00 | 05-02877-00 |
| 22 | Stem Washer | Stainless Steel | 04-06249-00 | 04-06270-00 | 04-06250-00 | 04-06251-00 | 04-06271-00 |
| 23 | Retaining Ring | Stainless Steel | 05-09386-00 | 05-09387-00 | 05-09388-00 | 05-09389-00 | 05-09390-00 |
| 24 | Top Flange | Cast Iron | 04-02261-00 | 04-02263-00 | 04-02268-00 | 04-02266-00 | — |
| | Repair Kit | | 08-09587-01 | 08-10980-00 | 08-10995-00 | | |

When ordering parts, it is essential that the valve type, size, service and serial number be stated.

Select part by item number, but order by part number.

Specify complete part number when ordering.

*These parts furnished in Repair Kit

WARNING: This product operates in pipelines or with equipment that carries fluids and/or gasses at elevated temperatures and pressures. Caution should be taken to make sure that the equipment is installed correctly and inspected regularly. Caution should also be taken to protect personnel from fluid or gas leakage."