

## FEATURES

- *Rolling diaphragm provides excellent sensitivity and provides maximum constant effective area, which translates into improved linearity.*
- *Modular construction provides maximum part interchangeability between direct and reverse-acting models and between selected case sizes — field reversibility is easily accomplished.*
- *High spring rates improve control valve stability.*
- *Minimal guiding assures low hysteresis in reverse-acting models — near zero hysteresis in direct-acting models.*
- *Stainless steel stems are standard for maximum performance in corrosive environments.*

### Temperature Limits:

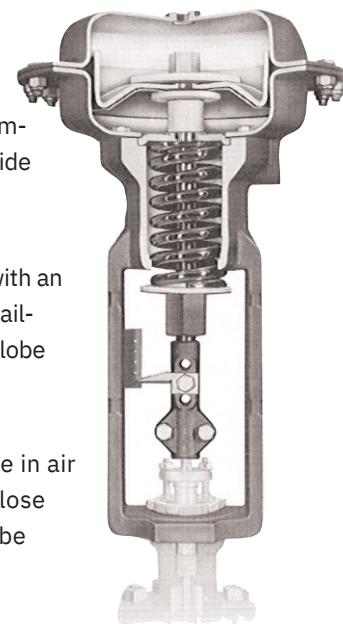
## D/R Series Spring-Diaphragm Pneumatic Linear Actuators

D/R Series actuators are linear spring diaphragm pneumatic actuators designed for reliable operation of control valves. The D/R is a rugged unit available in a combination of case sizes, strokes and springs to satisfy a wide range of applications.

The Type D, direct-acting actuator, strokes downward with an increase in air pressure. An opposing spring provides a fail-open response when attached to push-down-to-close globe control valves.

With the Type R, reverse-acting actuator, an increase in air pressure retracts the actuator stem, providing fail-close response when attached to push-down-to-close globe control valves.

For valves requiring longer travel and higher thrusts, the A46 and A47 are available. The A46 is a direct-acting actuator, while the A47 is a reverse-acting model.



## Specifications

|                                 |  |
|---------------------------------|--|
| <b>Diaphragm Cases:</b>         | Pressed steel  |
| <b>Stem:</b>                    | 303 SS   |
| <b>Diaphragm:</b>               | Dacron reinforced nitrile                                  |
| <b>Spring Barrel:</b>           | Cast Iron  |
| <b>Max. Case Pressure:</b>      | D/R Series: 65* psi (4.5 bar)<br>A46/A47: 45 psi (3.1 bar) |
| <b>Temperature Limits:</b>      | -40° F to +180° F ( -40° C to +82° C )                     |
| <b>Standard Air Connection:</b> | 3/8-inch NPT   |

\*Model DC (140 sq in) is limited to 45 psi (3.1 bar).

## Top-Mounted Overrides/Limit Stops

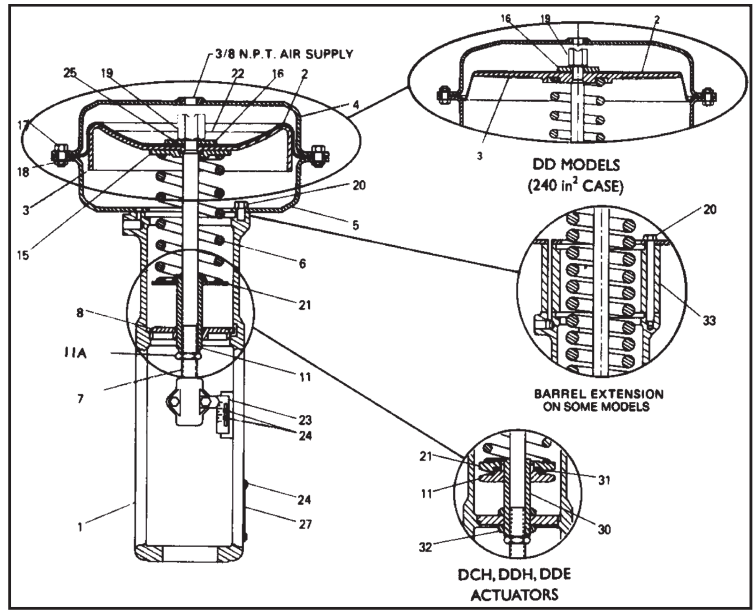
When applications require, Type I override/limit stops (lift stops) are designed to (1) limit the degree of valve opening with either direct or reverse-acting actuators or (2) manually override direct-acting actuators. This type of stop is available with D/RA, D/RB and D/RC actuators. With direct-acting actuators, a built-in stop nut to limit stem lift is furnished as a standard feature.

Optionally available with RA, RB and RC reverse-acting actuators is a Type II override limit stop for use in overriding or limiting the degree of valve closing.

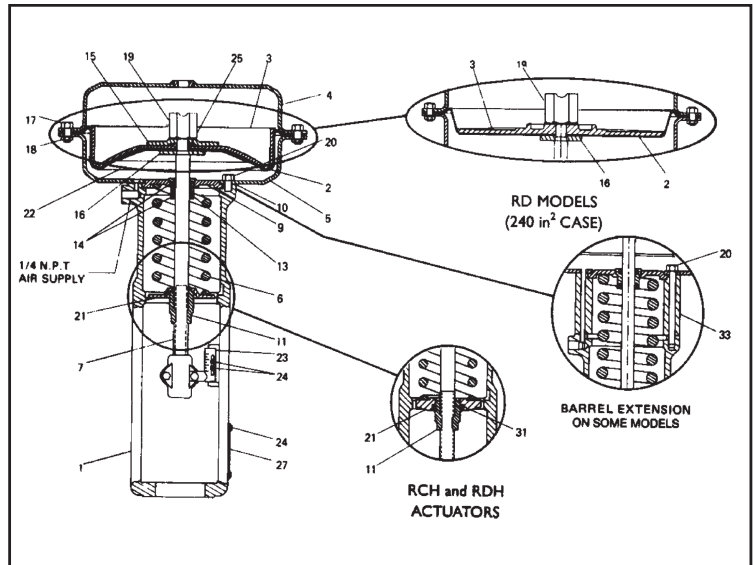
# Bill of Materials and Parts

| Part No. | Part Name                      | Material            |
|----------|--------------------------------|---------------------|
| 1        | Spring Barrel                  | Cast Iron           |
| 2        | Diaphragm                      | Nitrile/Dacron      |
| 3        | Piston                         | Carbon Steel        |
| 4        | Upper Diaphragm Case           | Carbon Steel        |
| 5        | Lower Diaphragm Case           | Carbon Steel        |
| 6        | Spring                         | Carbon Steel        |
| 7        | Spring Stem                    | 303 Stainless Steel |
| 8        | Barrel Bridge                  | Stainless Steel     |
| 9        | Packing Box Flange             | Carbon Steel        |
| 10       | Lower Case Gasket              | Neoprene            |
| 11       | Spring Adjuster                | Carbon Steel        |
| 12       | Down Travel Stop (not shown)   | Carbon Steel        |
| 13       | Packing Box                    | Brass               |
| 14       | Packing Box O-Ring             | Buna-N              |
| 15       | Piston Back-up Plate           | Carbon Steel        |
| 16       | Diaphragm Button               | Carbon Steel        |
| 17       | Hex Head Cap Screw             | Carbon Steel        |
| 18       | Hex Nut                        | Carbon Steel        |
| 19       | Up Travel Stop                 | Carbon Steel        |
| 20       | Hex Head Cap Screw             | Carbon Steel        |
| 21       | Spring Adjuster Button         | Carbon Steel        |
| 22       | Diaphragm Disc                 | Carbon Steel        |
| 23       | Travel Indicator Scale         | Stainless Steel     |
| 24       | Self Tap Screw                 | Carbon Steel        |
| 25       | Diaphragm O-Ring               | Buna-N              |
| 27       | Identification Tag             | Stainless Steel     |
| 28       | Stop Nut                       | Carbon Steel        |
| 30       | Spring Adjuster Screw          | Carbon Steel        |
| 31       | Spring Adjuster Thrust Bearing | Hardened Steel      |
| 32       | Jam Nut                        | Carbon Steel        |
| 33       | Spring Barrel Extension        | Carbon Steel        |
| 34       | Hex Head Cap Screw             | Carbon Steel        |

## Parts For Models DA, DB, DC and DD – Direct-Acting

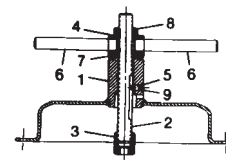


## Parts For Models RA, RB, RC and RD – Reverse-Acting



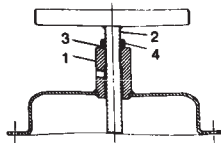
## Type II Override/Limit Stop Assembly For Reverse-Acting Actuator

| Part No. | Name                               |
|----------|------------------------------------|
| 1        | Limit Stop Diaphragm Case Assembly |
| 2        | Jacking Screw                      |
| 3        | Stem Nut                           |
| 4        | "T" Bar Hub                        |
| 5        | Set Screw                          |
| 6        | "T" Bar Handle                     |
| 7        | Thrust Washer                      |
| 8        | Hex Nut                            |
| 9        | Set Screw, Socket Jam              |



## Type I Override/Limit Stop Assembly

| Part No. | Name  |
|----------|---|
| 1        | Override/Limit Stop Diaphragm Case Assembly |
| 2        | Stem Assembly                               |
| 3        | Thread Sealing Washer*                      |
| 4        | Hex Nut                                     |

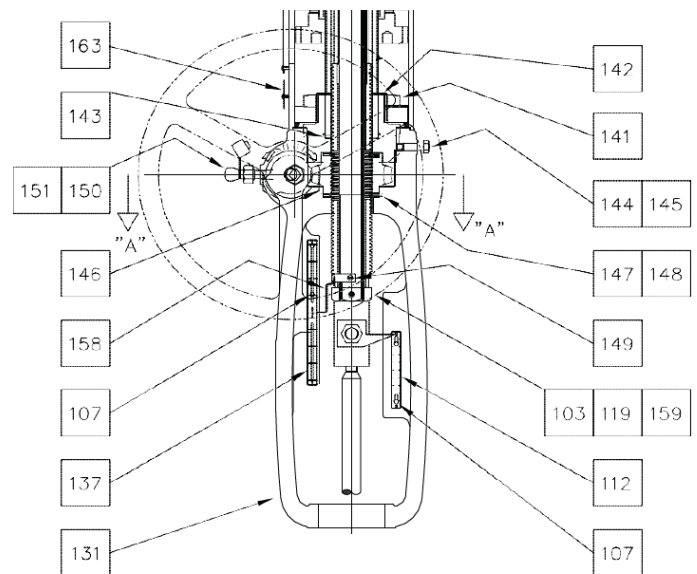
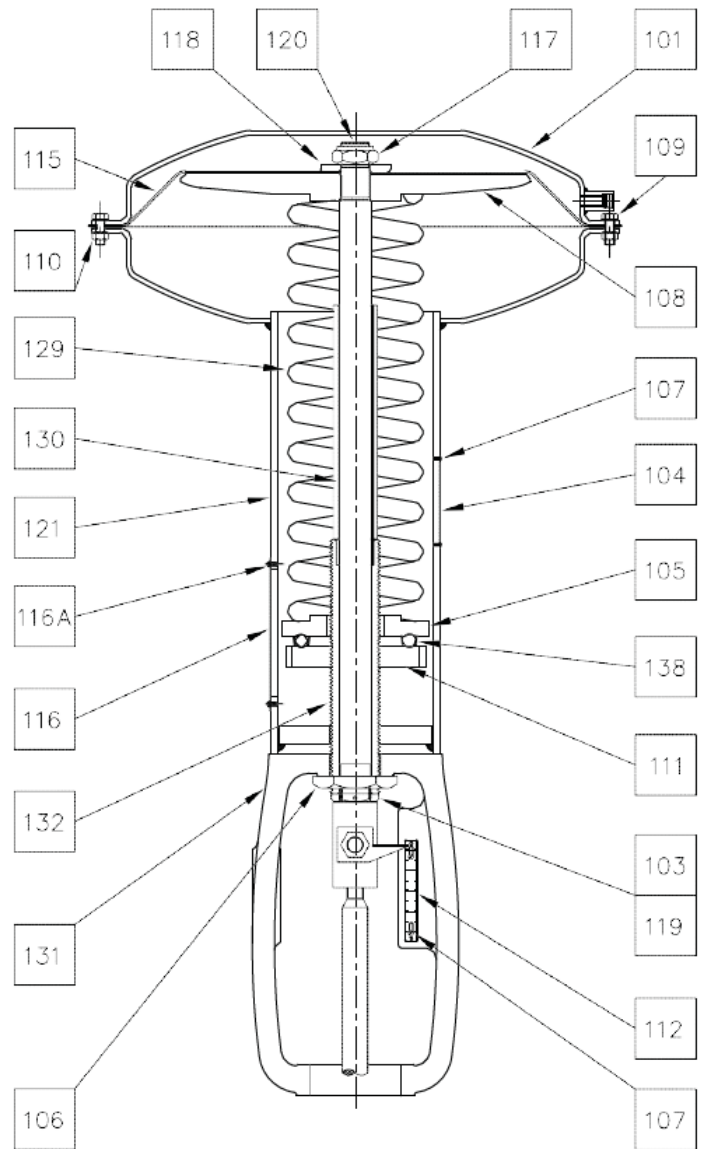


\*Direct-acting actuators only

# Bill of Materials and Parts

## Parts For Models A46 – Direct-Acting

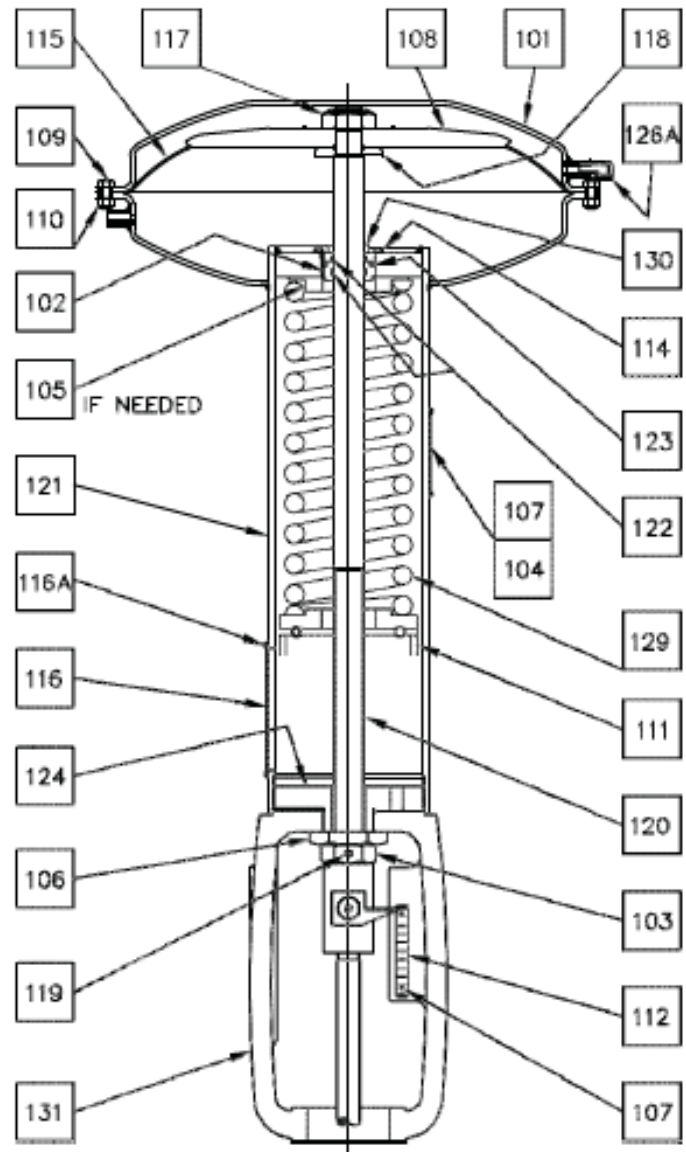
| Part No.                            | Part Name                              | Material     |
|-------------------------------------|--|--------------|
| 81                                  | LIFT EYE BOLT (not shown)              | STEEL        |
| 100                                 | STEM CONNECTOR                         | STEEL        |
| 101                                 | DIAPHRAGM CASE ASSY.                   | STEEL        |
| 103                                 | HEX NUT 1 1/4-12                       | STEEL        |
| 104                                 | I.D. PLATEGLOBE VALVE                  | 300 SS       |
| 105                                 | SPRING SEAT                            | STEEL        |
| 106                                 | HEX NUT 2-12                           | STEEL        |
| 107                                 | NAME PLATESCREWS                       | 316 SS       |
| 108                                 | DIAPHRAGMPLATE                         | CAST IRON    |
| 109                                 | HHC SCREW 3/8 -16x1.00"                | STEEL        |
| 110                                 | HEX NUT 3/8 -16                        | STEEL        |
| 111                                 | SPRING ADJUSTER                        | CAST IRON    |
| 112                                 | TRAVEL IND. SCALE 3.50"                | 300 SS       |
| 115                                 | MOLDED DIAPHRAGM CASE                  | BUNA-N       |
| 116                                 | DUST COVER                             | 300 SS       |
| 116A                                | SCREW RD HD, 5/32 x 1/4"               | STEEL        |
| 117                                 | LOCK NUT 1 1/8 -12UNF-3B               | STEEL        |
| 118                                 | DIAPHRAGMWASHER                        | STEEL        |
| 119                                 | SOCKET HEAD SETSCREW                   | STEEL        |
| 120                                 | ACTUATOR STEM                          | STEEL        |
| 121                                 | SPRING BARREL CASEASSY                 | STEEL        |
| 129                                 | ACTUATOR SPRING                        | STEEL        |
| 130                                 | TRAVEL STOP                            | STEEL        |
| 131                                 | YOKE                                   | CAST IRON    |
| 132                                 | SPRING ADJUSTING SCREW                 | STEEL        |
| 138                                 | BALL THURST RETAINER                   | STEEL        |
| <b>Side-Mounted Handwheel Parts</b> |  |              |
| 136                                 | JACKING SCREW ASSY                     | STEEL        |
| 137                                 | HANDWHEELTRAVEL IND.SCALE              | 300 SS       |
| 141                                 | CLAMP NUT 3 1/2 -12                    | STEEL        |
| 142                                 | BEARING RETAINER                       | STEEL        |
| 143                                 | JACK SCREW KEY                         | STEEL        |
| 144                                 | SCREW 3/8 -16x1 1/16                   | STEEL        |
| 145                                 | SPLIT LOCKWASHER, 3/8" LIGHT S.Z.P.    | STEEL        |
| 146                                 | WORM GEAR                              | CAST IRON    |
| 147                                 | THRUST BEARING                         | STEEL        |
| 148                                 | THRUST RACE                            | STEEL        |
| 149                                 | TRAVEL IND. SCREW, 6-32 x 3/16 S.Z.P.  | STEEL        |
| 150                                 | GREASE FITTING                         | STEEL        |
| 151                                 | GREASE CAP,POLYETHYLENE                | POLYETHYLENE |
| 158                                 | TRAVEL INDICATOR                       | BRASS        |
| 159                                 | SET SCREW DISC                         | COPPER       |
| 163                                 | COVER PLATE                            | ALUMINUM     |
| 999                                 | SPRING ADJUSTER ASSY,<br>2.63"-12UN-2B | STEEL        |



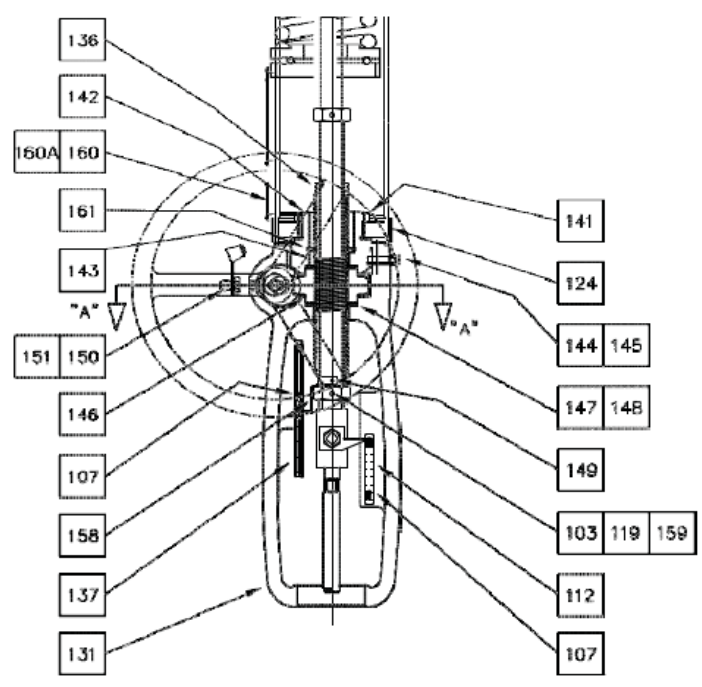
# Bill of Materials and Parts

## Parts For Models A47 – Reverse-Acting

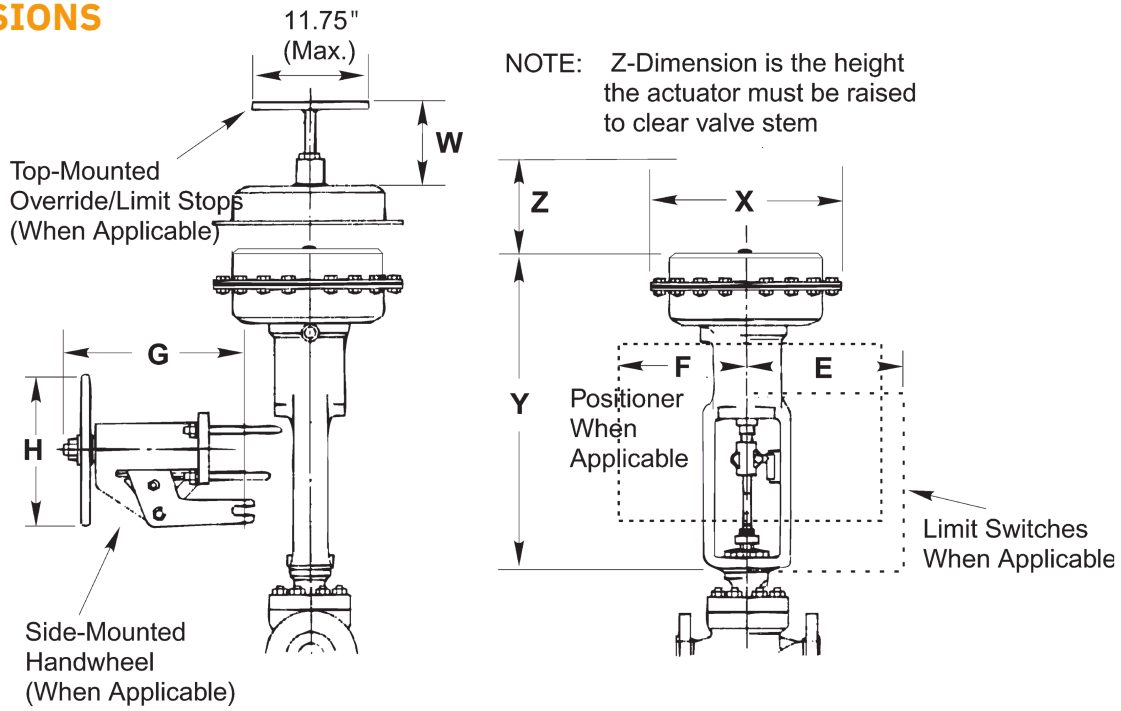
| Part No. | Part Name                         | Material  |
|----------|-----------------------------------|-----------|
| 81       | LIFT EYE BOLT (not shown)         | STEEL     |
| 101      | DIAPHRAGM CASE ASSY.              | STEEL     |
| 102      | PACKING BOX                       | BRASS     |
| 103      | HEX NUT 1¼-12                     | STEEL     |
| 104      | I.D PLATE GLOBE VALVE             | 300 SS    |
| 105      | SPRING SEAT                       | STEEL     |
| 106      | HEX NUT 2-12                      | STEEL     |
| 107      | NAME PLATE SCREWS                 | 316 SS    |
| 108      | DIAPHRAGM PLATE                   | CAST IRON |
| 109      | HHC SCREW ¾ -16x1.00"             | STEEL     |
| 110      | HEX NUT ¾ -16                     | STEEL     |
| 111      | SPRING ADJUSTER                   | CAST IRON |
| 112      | TRAVEL IND. SCALE 3.50"           | 300 SS    |
| 114      | SCREW 10-32x ¾                    | STEEL     |
| 115      | MOLDED DIAPHRAGM CASE             | BUNA-N    |
| 116      | DUST COVER                        | 300 SS    |
| 116A     | SCREW RD HD, ⅝ <sub>32</sub> x ¼" | STEEL     |
| 117      | LOCK NUT 1½ -12UNF-3B             | STEEL     |
| 118      | DIAPHRAGM WASHER                  | STEEL     |
| 119      | SOCKETHEAD SET SCREW              | STEEL     |
| 120      | ACTUATOR STEM                     | STEEL     |
| 121      | SPRING BARREL CASE ASSY           | STEEL     |
| 122      | "O"RING                           | BUNA-N    |
| 123      | "O"RING                           | BUNA-N    |
| 124      | LOWER BRIDGE                      | CAST IRON |
| 126A     | AIR VENT ¼" N.P.T.                | STEEL     |
| 129      | ACTUATOR SPRING                   | STEEL     |
| 130      | TRAVEL STOP                       | STEEL     |
| 131      | YOKE                              | CAST IRON |



| Side-Mounted Handwheel Parts |   |              |
|------------------------------|---|--------------|
| 136                          | JACKING SCREW                                 | STEEL        |
| 137                          | HANDWHEEL TRAVEL IND.SCALE                    | STEEL        |
| 141                          | CLAMP NUT 3 ½-12                              | STEEL        |
| 142                          | BEARING RETAINER                              | STEEL        |
| 143                          | JACK SCREW KEY                                | STEEL        |
| 144                          | SCREW ¾ -16x1 ¼ <sub>16</sub>                 | STEEL        |
| 145                          | SPLIT LOCKWASHER, ¾" LIGHT                    | STEEL        |
| 146                          | WORM GEAR                                     | CAST IRON    |
| 147                          | THRUST BEARING                                | STEEL        |
| 148                          | THRUST RACE                                   | STEEL        |
| 149                          | TRAVEL IND.SCREW, 6-32x¾ <sub>16</sub> S.Z.P. | STEEL        |
| 150                          | GREASE FITTING                                | STEEL        |
| 151                          | GREASE CAP                                    | POLYETHYLENE |
| 158                          | TRAVEL INDICATOR                              | BRASS        |
| 159                          | SETSCREWDISC                                  | COPPER       |
| 160                          | COVER PLATE                                   | ALUMINUM     |
| 160A                         | SCREW 4-40x.25"LG                             | STEEL        |
| 161                          | RETAINING RING                                | STEEL        |



# DIMENSIONS



| Actuator Model | Third & Forth Position Code            | Actuator Dimensions inches (mm) |              |             | Accessory Dimensions — inches (mm) |              |                |               |               | Approx. Weight lb (kg) |
|----------------|--|---------------------------------|--------------|-------------|------------------------------------|--------------|----------------|---------------|---------------|------------------------|
|                |  | X                               | Y            | Z (Max)     | W Jackscrew                        | E (Max L.S.) | F (Max Posit.) | G (Max Hdwhl) | H (Norm Dia.) |                        |
| DA/RA          | A1, A2, C1, C2, D1, D2, DC, DD         | 12.00 (305)                     | 18.75 (476)  | 6.50 (165)  | 5.88 (149)                         | 8.00 (203)   | 12.00 (305)    | 12.00 (305)   | 10.00 (254)   | 45 (21)                |
| DA/RA          | B9, C6, C8, D5, DE, DF                 | 12.00 (305)                     | 21.63 (549)  | 6.50 (165)  | 5.88 (149)                         | 9.00 (229)   | 12.00 (305)    | 12.00 (305)   | 10.00 (254)   | 45 (21)                |
| DA/RA          | C3, C4, D3, D4                         | 12.00 (305)                     | 23.10 (587)  | 6.50 (165)  | 5.88 (149)                         | 9.00 (229)   | 12.00 (305)    | 12.00 (305)   | 10.00 (254)   | 52 (24)                |
| DB/RB          | C3, C4, D1, D3, D4                     | 13.81 (351)                     | 23.35 (593)  | 6.50 (165)  | 5.75 (146)                         | 8.00 (203)   | 12.00 (305)    | 12.00 (305)   | 10.00 (254)   | 67 (31)                |
| DB/RB          | BB, C1, C2, CA, CB, DC, DD, E1, E2, EE | 13.81 (351)                     | 22.88 (581)  | 6.50 (165)  | 5.75 (146)                         | 9.00 (229)   | 13.00 (330)    | 12.00 (305)   | 10.00 (254)   | 67 (31)                |
| DC/RC          | B1, C1, C2, CA, CB, DD, E1, E2         | 17.00 (432)                     | 23.88 (607)  | 6.50 (165)  | 5.75 (146)                         | 9.00 (229)   | 14.00 (356)    | 12.00 (305)   | 10.00 (254)   | 82 (38)                |
| DC/RC          | BB, C3, C4, DC, EA, EB                 | 17.00 (432)                     | 27.25 (692)  | 6.50 (165)  | 5.63 (143)                         | 9.00 (229)   | 14.00 (356)    | 12.00 (305)   | 10.00 (254)   | 95 (43)                |
| DC/RC          | HF, H1, H2                             | 17.00 (432)                     | 32.50 (826)  | 8.50 (216)  | 5.75 (146)                         | 9.00 (229)   | 14.00 (356)    | 12.00 (305)   | 10.00 (254)   | 105 (48)               |
| DC/RC          | D3, E3, E4                             | 17.00 (432)                     | 33.35 (847)  | 10.00 (254) | 5.75 (146)                         | 10.00 (254)  | 15.00 (381)    | 16.00 (406)   | 15.00 (381)   | 105 (48)               |
| DD/RD          | E1, E2, EA, EB, EC, ED                 | 22.00 (559)                     | 32.88 (835)  | 8.50 (216)  | -                                  | 10.00 (254)  | 15.00 (381)    | 16.00 (406)   | 10.00 (254)   | 130 (59)               |
| DD/RD          | H1, H2                                 | 22.00 (559)                     | 33.25 (845)  | 10.00 (254) | -                                  | 10.00 (254)  | 15.00 (381)    | 16.00 (406)   | 15.00 (381)   | 130 (59)               |
| A46A           | -                                      | 21.00 (534)                     | 38.50 (978)  | 10.00 (254) | -                                  | 10.00 (254)  | 15.00 (381)    | -             | -             | 160 (73)               |
| A46B*          | -                                      | 21.00 (534)                     | 47.00 (1194) | 10.00 (254) | -                                  | 10.00 (254)  | 15.00 (381)    | 6.50 (165)    | 15.00 (381)   | 175 (80)               |
| A47A           | -                                      | 21.00 (534)                     | 42.25 (1073) | 10.00 (254) | -                                  | 10.00 (254)  | 15.00 (381)    | -             | -             | 175 (80)               |
| A47B*          | -                                      | 21.00 (534)                     | 53.50 (1359) | 10.00 (254) | -                                  | 10.00 (254)  | 15.00 (381)    | 6.50 (165)    | 15.00 (381)   | 190 (86)               |

\*Integral handwheel is offset; minimal radial clearance is 9.25" (235mm).

## How To Order

For actuator selection, refer to KOSO Hammel Dahl actuator selection guide. For options not shown or to enter an order, contact your local sales representative.

### D/R Series

| 1 | Model   |
|---|---|
| D | Direct-acting—Stem extends with increased air pressure    |
| R | Reverse-acting—Stem retracts with increasing air pressure |

| 2, 3      | Case Size/ Mount/ Travel |        |       |       |       |       |
|-----------|--------------------------|--------|-------|-------|-------|-------|
| Case Size | Mount                    | Travel |       |       |       |       |
|           |                          | 0.750  | 1.000 | 1.125 | 1.500 | 2.250 |
| 56        | 2.125                    | AA     | AD    | AC    | —     | —     |
|           | 2.812                    | —      | —     | AB    | —     | —     |
| 84        | 2.125                    | BA     | BD    | BC    | —     | —     |
|           | 2.812                    | —      | —     | BB    | BE    | —     |
| 140       | 2.125                    | —      | CD    | CC    | —     | —     |
|           | 2.812                    | —      | —     | CB    | CE    | —     |
|           | 3.562                    | —      | —     | —     | —     | CH    |
| 240       | 2.812                    | —      | —     | —     | DE    | —     |
|           | 3.562                    | —      | —     | —     | —     | DH    |

| 4, 5 | Spring Span & Adjuster                                    |
|------|---|
|      | Refer to Actuator Selection Guide for proper combination. |

| 6 | Variations                               |
|---|--|
| A | None                                     |
| B | Type I Top-Mounted Override/Limit Stop*  |
| C | Type II Top-Mounted Override/Limit Stop* |
| D | 3/4-inch NPT Air Connections             |
| Z | Special Actuator (See Factory)           |

\*Refer to page 1 for limitations.

Subject to change without prior notice.

### Side-Mounted Bolt-on Handwheel

The SM-1 or SM-2 side-mounted bolt on handwheel is available for D/RA, D/RB, D/RC and D/RD series actuators as shown in the following table.

| To Mount On | Code         | Model |
|-------------|--------------|-------|
| DA or RA    | All          | SM-1  |
| DB or RB    | All          | SM-1  |
| DC or RC    | All, except  | SM-2  |
| DD or RD    | list below * | SM-2  |

\*RCDDHA, RCC2HA, RCCBHA, RCBBA, RCE2HA, RCEBHA, RDE2LA,

RDEBLA - Use SM-1 with Extra Heavy arm assembly

RCH2LA and RDH2LA cannot have side mounted handwheels

01/24

**KOSO VECTOR** kentintrol™

**PSA**  
ELECTRAULIC™ ACTUATION

**PARCOL**

### A46/A47 Series

| 1   | Model  |
|-----|--|
| A46 | Direct acting - Stem extends with increased air pressure   |
| A47 | Reverse acting - Stem retracts with increased air pressure |

| 2 | Variations                      |
|---|---------------------------------|
| A | Standard                        |
| B | Integral side mounted handwheel |

| 3 | Case Size                                  |
|---|--|
| K | 200 in <sup>2</sup> nominal effective area |

| 4 | Mount           |
|---|-----------------|
| F | 3.563 in. mount |

| 5 | Travel         |
|---|----------------|
| 8 | 3.5 in. travel |

| 6 | Spring Range   |
|---|--|
| A | 3 - 15 spring (standard for A46 direct acting actuator)  |
| B | 6 - 30 spring (standard for A47 reverse acting actuator) |

| 7 | Options               |
|---|-----------------------|
| B | Standard construction |

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CONTROL VALVES

# KOSO HAMMEL DAHL