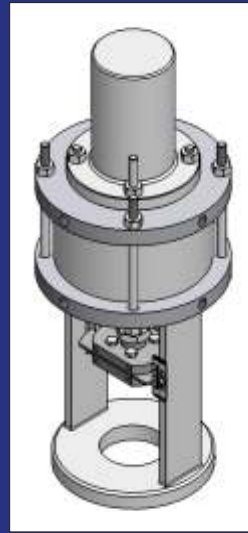
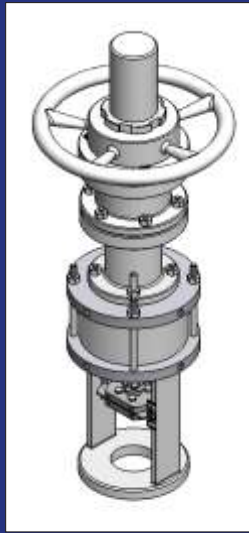


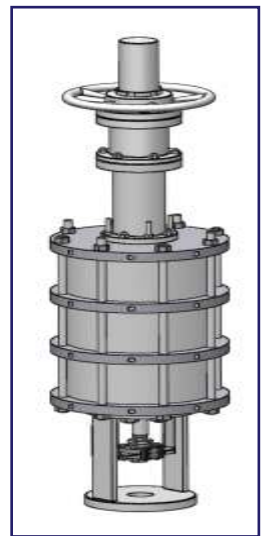
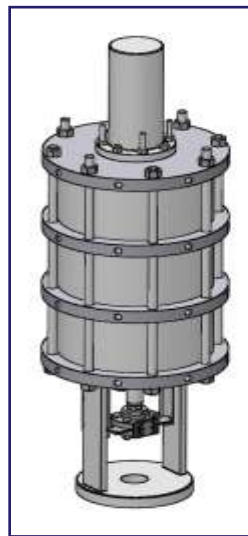
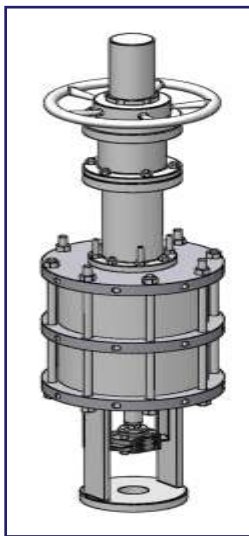
# BATOR



**BOMAF**<sup>®</sup>  
Special Valve Solutions



# AGTU



Most

- Rugged
- Maintenance friendly
- Compact
- And a variety of other features

## Actuator

Bomafa actuators are designed for fitment on exhaustive range of Control Valves offering unmatched performance. Double acting cylinder piston spring return linear action actuators are very powerful and robust in nature. Actuators are used for on-off / modulating application. They are available in various sizes, a wide range of stroke lengths coupled with very high thrust capability. These actuators have variety of spring ranges with options for air to retract or extend and when coupled with positioners give extremely stiff precise positioning and control over the entire stroke length.

### Features:

- Wide range of sizes – Available in varying sizes to suit almost all process demand.
- Higher thrust – With standard air supply can produce extremely high thrust.
- Long stroke length – Very high stroke length of more than 200 mm is available as a standard
- Response time – Very fast response time available against Spring and Diaphragm actuators. For Bypass applications response time of <1 sec is typical.
- Robust construction – The construction is extremely robust, trouble free and low cost ownership.
- Field reversible – Incorporates spring for necessary air to extend and air to retract application apart from field reversible provision.
- Compact – Extremely compact when compared with their counterpart Spring and Diaphragm actuators.
- Maintenance friendly – The design is user friendly and can be easily mantled and dismantled at site within a very short span of time.
- Handwheel – Top or side mounted hand wheel depending on the requirement is provided.
- High rigidity – Due to the air pressure available on both the sides of the piston, it gives stiff, precise positioning.

### Principle of Operation:

- Under normal condition, the actuator reacts to a force unbalanced which is created by giving air supply pressure on one side of the piston and simultaneously decreasing it on other side. This would move the piston up or down and this results in positioning of the final valve control element.
- Actuator does not require internal spring for positioning when it is operated as double acting unit with positioner and spring performs only as fail safe device.

### Instruments and Accessories:

- The performance of the Actuator is greatly affected and enhanced when coupled with sensitive and accurate accessories.
- These would typically include E/P smart positioners. In addition, various other instruments like in built position transmitters, volume boosters, air lock relays, solenoid valves, air filter regulators, limit switches to name a few can be supplied depending on the process requirement.

### Installation:

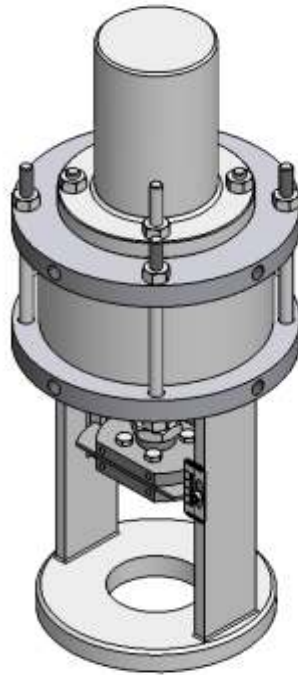
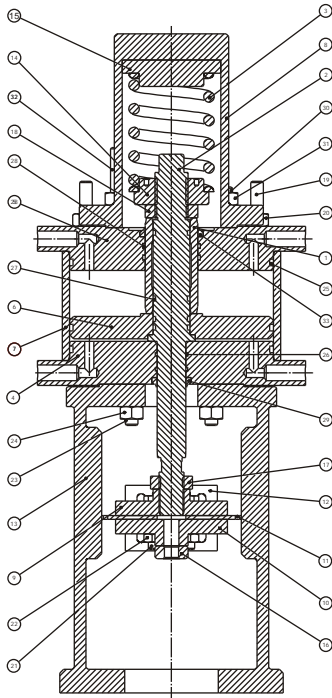
The actuator is normally installed in the vertical direction above the valve body. For other type of installations, lower and higher sizes consult factory.

## Actuator Model Number (Decodification)

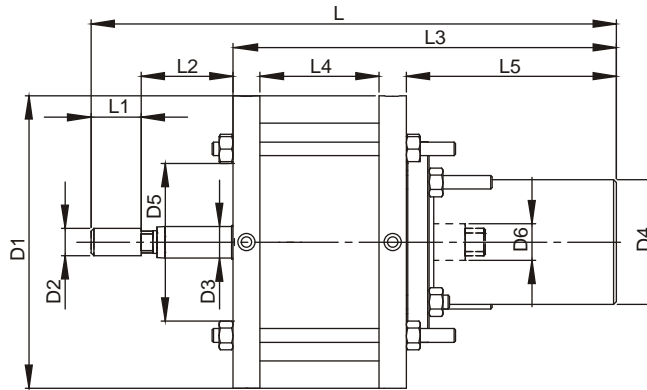
| A      | B                       | C                          | D               | E                   | F      | G      | H         |
|--------|-------------------------|----------------------------|-----------------|---------------------|--------|--------|-----------|
| Series | Design Pressure PSI (g) | Type of Cylinder (C/DC/TC) | Piston Diameter | Piston Rod Diameter | Stroke | Air to | Handwheel |
| BO     | 85                      | C                          | 155             | 22                  | 25     | R      | HT        |

**For Example :- Above Model No. will be BO.85.C155/22.25.R.HT**

|          |                         |  |
|----------|-------------------------|--|
| <b>A</b> | <b>Series</b>           |  |
|          | BO                      | Bomafa                                       |
| <b>C</b> | <b>Type of Cylinder</b> |  |
|          | C/DC/TC                 | Cylinder / Double Cylinder / Triple Cylinder |
| <b>G</b> | <b>Ari To</b>           |  |
|          | R                       | Retract                                      |
|          | E                       | Extend                                       |
| <b>H</b> | <b>Handwheel</b>        |  |
|          | HT                      | Handwheel Top Mounted                        |
|          | HS                      | Handwheel Side Mounted                       |



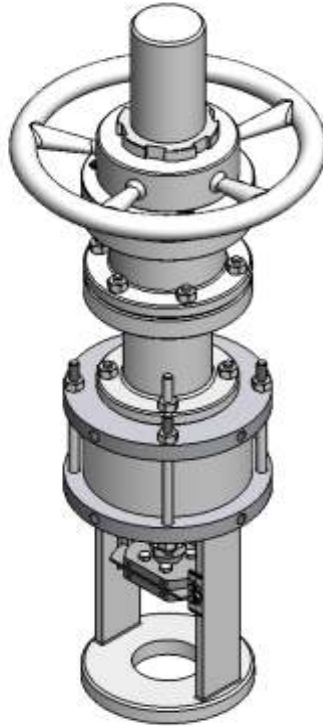
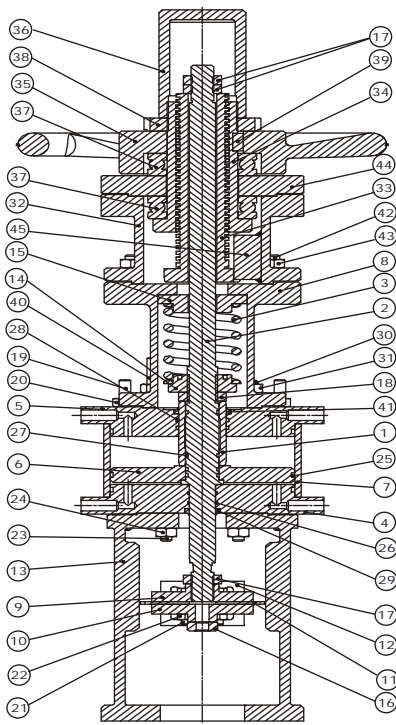
| NO | QTY | PART NAME                      | MATERIAL        |
|----|-----|--------------------------------|-----------------|
| 1  | 1   | Actuator Spindle Bush          | SA 479 TP 304   |
| 2  | 1   | Actuator Spindle               | SA 479 TP 304   |
| 3  | 1   | Actuator Spring                | Spring Steel    |
| 4  | 1   | Bottom Cover                   | SA 516 GR 70    |
| 5  | 1   | Top Cover                      | SA 516 GR 70    |
| 6  | 1   | Piston                         | SA 516 GR 70    |
| 7  | 1   | Cylinder                       | SA 106 GR B     |
| 8  | 1   | Cover Cap                      | SA 216 GR WCB   |
| 9  | 1   | Coupling Actuator              | SS 304          |
| 10 | 1   | Coupling Valve Spindle         | SS 304          |
| 11 | 1   | Travel indicator               | SS 304          |
| 12 | 1   | Take Off Arm Adjuster          | SS 304          |
| 13 | 1   | Yoke                           | SA 216 GR WCB   |
| 14 | 1   | Spring Cover Lower             | Carbon Steel    |
| 15 | 1   | Spring Cover Upper             | Carbon Steel    |
| 16 | 1   | HH Nut - 1/2"                  | SA 479 TP 304   |
| 17 | 1   | HH Nut - 3/4"                  | SA 479 TP 304   |
| 18 | 1   | HH Nut - 1"                    | SA 479 TP 304   |
| 19 | 4   | Tie Rod                        | Carbon Steel    |
| 20 | 8   | HH Nut - 3/8"                  | SA 194 GR 2H    |
| 21 | 4   | Bolt - 1/4"                    | SA 193 GR B7    |
| 22 | 4   | HH Nut - 1/4"                  | SA 194 GR 2H    |
| 23 | 6   | Yoke Stud - 3/8"               | SA 193 GR B7    |
| 24 | 6   | HH Nut - 3/8"                  | SA 194 2H       |
| 25 | 3   | O - Ring (155 x 145.64 x 3.53) | NBR 70          |
| 26 | 2   | O - Ring (22 X 21.95 X 1.78)   | NBR 70          |
| 27 | 4   | O - Ring (28 x 23.47 x 2.62)   | NBR 70          |
| 28 | 2   | O - Ring (40 x 39.34 x 2.62)   | NBR 70          |
| 29 | 1   | NBR (A1 2010 N3587)            | Neoprene Rubber |
| 30 | 2   | Cover Cap Stud - 3/8"          | SA 193 GR B7    |
| 31 | 4   | HH Nut - 3/8"                  | SA 194 GR 2H    |
| 32 | 2   | Cover Cap Big stud (3/8")      | SA 193 GR B7    |
| 33 | 1   | NBR (A1 4005 N3587)            | Neoprene Rubber |



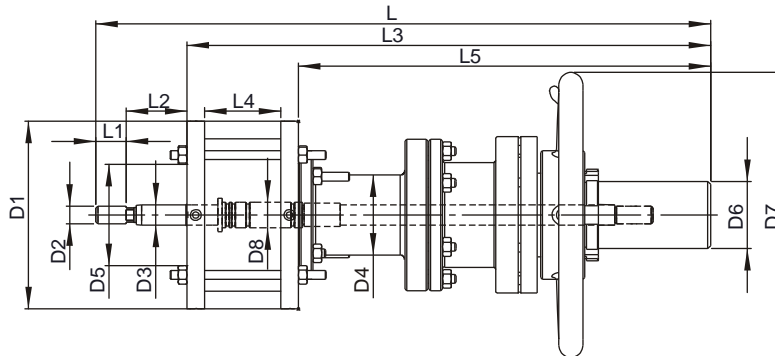
| Series | Piston Dia. | D1  | D2 (Piston Rod Thread - UNF) | D3 (Piston Rod - Ø) | L1 | L2  | L     | Stroke       | D4  | D5  | L3    | L4  | L5    | Spring Condition | MAWP (PSI) | Weight (Kg.) |     |
|--------|-------------|-----|------------------------------|---------------------|----|-----|-------|--------------|-----|-----|-------|-----|-------|------------------|------------|--------------|-----|
|        |             |     |                              |                     |    |     |       |              |     |     |       |     |       |                  |            | R            | E   |
| BO     | 155         | 204 | 3/4"                         | 22                  | 33 | 66  | 366.5 | 25/15        | 87  | 110 | 266.5 | 83  | 146.5 | With Spring      | 85         | 32           | 31  |
| BO     | 205         | 258 | 3/4"                         | 22                  | 33 | 89  | 464   | 50/40/25/15  | 114 | 125 | 341   | 104 | 200   | With Spring      | 85         | 49           | 49  |
| BO     | 295         | 383 | 1-1/2"                       | 42                  | 48 | 247 | 1101  | 200/180/175  | 168 | 170 | 805   | 282 | 446   | With Spring      | 85         | 178          | 176 |
|        |             |     |                              |                     |    | 197 | 951   | 150/130      | 140 | 170 | 705   | 232 | 396   | With Spring      |            | 186          | 185 |
|        |             |     |                              |                     |    | 142 | 786   | 100/70/50/40 | 140 | 170 | 595   | 182 | 336   | With Spring      |            | 218          | 216 |
| BO     | 325         | 410 | 1-1/2"                       | 42                  | 48 | 247 | 1101  | 200/180/175  | 168 | 170 | 805   | 282 | 446   | With Spring      | 85         | 198          | 197 |
|        |             |     |                              |                     |    | 197 | 951   | 150/130      | 140 | 170 | 705   | 232 | 396   | With Spring      |            | 207          | 206 |
|        |             |     |                              |                     |    | 142 | 786   | 100/70/50/40 | 140 | 170 | 595   | 182 | 336   | With Spring      |            | 238          | 236 |
| BO     | 375         | 460 | 1-1/2"                       | 42                  | 48 | 247 | 1101  | 200/180/175  | 168 | 170 | 805   | 282 | 446   | With Spring      | 85         | 238          | 236 |
|        |             |     |                              |                     |    | 197 | 951   | 150/130      | 140 | 170 | 705   | 232 | 396   | With Spring      |            | 249          | 247 |
|        |             |     |                              |                     |    | 142 | 786   | 100/70/50/40 | 140 | 170 | 595   | 182 | 336   | With Spring      |            | 282          | 279 |

| Series | Piston dia. | Piston rod dia. inside cylinder (D3) | Piston rod dia. Inside cover cap (D6) | Pressure(kg/cm2) |            |            |            |            |            |            |            |            |            |            |            |            |            |
|--------|-------------|--------------------------------------|---------------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|        |             |                                      |                                       | 3                |            | 3.5        |            | 4          |            | 4.5        |            | 5          |            | 5.5        |            | 6          |            |
|        |             |                                      |                                       | Force (KN)       | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) |
|        |             |                                      |                                       | R                | E          | R          | E          | R          | E          | R          | E          | R          | E          | R          | E          | R          | E          |
| BO     | 155         | 22                                   | 28                                    | 5.44             | 5.37       | 6.34       | 6.26       | 7.24       | 7.15       | 8.15       | 8.05       | 9.06       | 8.95       | 9.97       | 9.84       | 10.87      | 10.74      |
| BO     | 205         | 22                                   | 28                                    | 9.59             | 9.52       | 11.19      | 11.11      | 12.79      | 12.7       | 14.39      | 14.29      | 15.99      | 15.87      | 17.59      | 17.46      | 19.19      | 19.05      |
| BO     | 295         | 42                                   | 43                                    | 19.69            | 19.67      | 22.97      | 22.94      | 26.25      | 26.22      | 29.53      | 29.5       | 32.82      | 32.78      | 36.1       | 36.06      | 39.38      | 39.34      |
| BO     | 325         | 42                                   | 43                                    | 23.99            | 23.97      | 27.98      | 27.96      | 31.98      | 31.95      | 35.98      | 35.95      | 39.98      | 39.95      | 43.98      | 43.94      | 47.98      | 47.93      |
| BO     | 375         | 42                                   | 43                                    | 32.07            | 32.05      | 37.42      | 37.39      | 42.76      | 42.73      | 48.1       | 48.07      | 53.45      | 53.42      | 58.8       | 58.76      | 64.14      | 64.1       |

Note : Spindle Dimension in Retract Position.



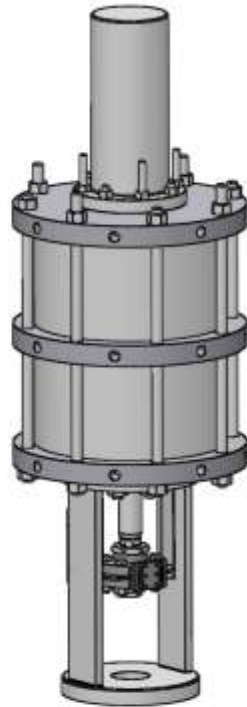
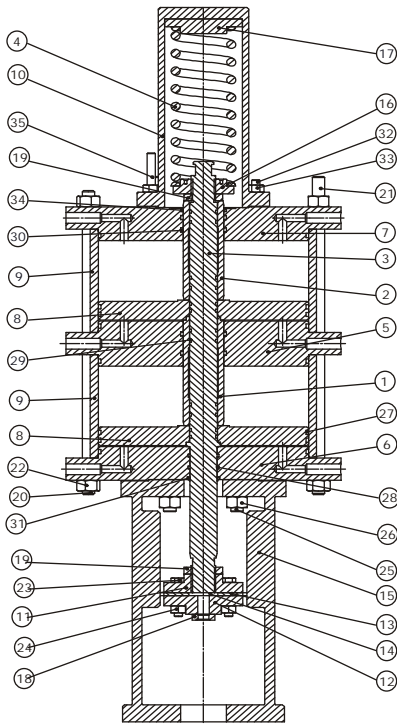
| NO | QTY | PART NAME                      | MATERIAL        |
|----|-----|--------------------------------|-----------------|
| 1  | 1   | Actuator Spindle Bush          | SA 479 TP 304   |
| 2  | 1   | Actuator Spindle               | SA 479 TP 304   |
| 3  | 1   | Actuator Spring                | Spring Steel    |
| 4  | 1   | Bottom Cover                   | SA 516 GR 70    |
| 5  | 1   | Top Cover                      | SA 516 GR 70    |
| 6  | 1   | Piston                         | SA 516 GR 70    |
| 7  | 1   | Cylinder                       | SA 106 GR B     |
| 8  | 1   | Cover Cap                      | SA 216 GR WCB   |
| 9  | 1   | Coupling Actuator              | SS 304          |
| 10 | 1   | Coupling Valve Spindle         | SS 304          |
| 11 | 1   | Travel indicator               | SS 304          |
| 12 | 1   | Take Off Arm Adjuster          | SS 304          |
| 13 | 1   | Yoke                           | SA 216 GR WCB   |
| 14 | 1   | Spring Cover Lower             | Carbon Steel    |
| 15 | 1   | Spring Cover Upper             | Carbon Steel    |
| 16 | 1   | HH Nut - 1/2"                  | SA 479 TP 304   |
| 17 | 3   | HH Nut - 3/4"                  | SA 479 TP 304   |
| 18 | 1   | HH Nut - 1"                    | SA 479 TP 304   |
| 19 | 4   | Tie Rod                        | Carbon Steel    |
| 20 | 8   | HH Nut - 3/8"                  | SA 194 GR 2H    |
| 21 | 4   | Bolt - 1/4"                    | SA 193 GR B7    |
| 22 | 4   | HH Nut - 1/4"                  | SA 194 GR 2H    |
| 23 | 6   | Yoke Stud - 3/8"               | SA 193 GR B7    |
| 24 | 6   | HH Nut - 3/8"                  | SA 194 GR 2H    |
| 25 | 3   | O - Ring (155 x 145.64 x 3.53) | NBR 70          |
| 26 | 2   | O - Ring (22 X 21.95 X 1.78)   | NBR 70          |
| 27 | 4   | O - Ring (28 x 23.47 x 2.62)   | NBR 70          |
| 28 | 2   | O - Ring (40 x 39.34 x 2.62)   | NBR 70          |
| 29 | 1   | NBR (A1 2010 N3587)            | Neoprene Rubber |
| 30 | 2   | Cover Cap Stud - 3/8"          | SA 193 GR B7    |
| 31 | 4   | HH Nut - 3/8"                  | SA 194 GR 2H    |
| 32 | 1   | Handwheel Stem Cover           | Carbon Steel    |
| 33 | 1   | Lead Screw Inner               | SS 410          |
| 34 | 1   | Lead Screw Outer               | Bronze          |
| 35 | 1   | Handwheel                      | Carbon Steel    |
| 36 | 1   | Bearing Cover Cap              | Carbon Steel    |
| 37 | 2   | Thrust Bearing (O-19)          | Heavy Duty      |
| 38 | 1   | Lock - Nut                     | SA 479 TP 304   |
| 39 | 1   | Key For Handwheel              | Carbon Steel    |
| 40 | 2   | Cover Cap Big stud (3/8")      | SA 193 GR B7    |
| 41 | 1   | NBR (A1 4005 N3587)            | Neoprene Rubber |
| 42 | 6   | Stem Cover Stud - 3/8"         | SA 193 GR B7    |
| 43 | 6   | HH Nut - 3/8"                  | SA 194 GR 2H    |
| 44 | 1   | Stem Cover Flange              | Carbon Steel    |
| 45 | 1   | Stem Cover Plate               | Carbon Steel    |



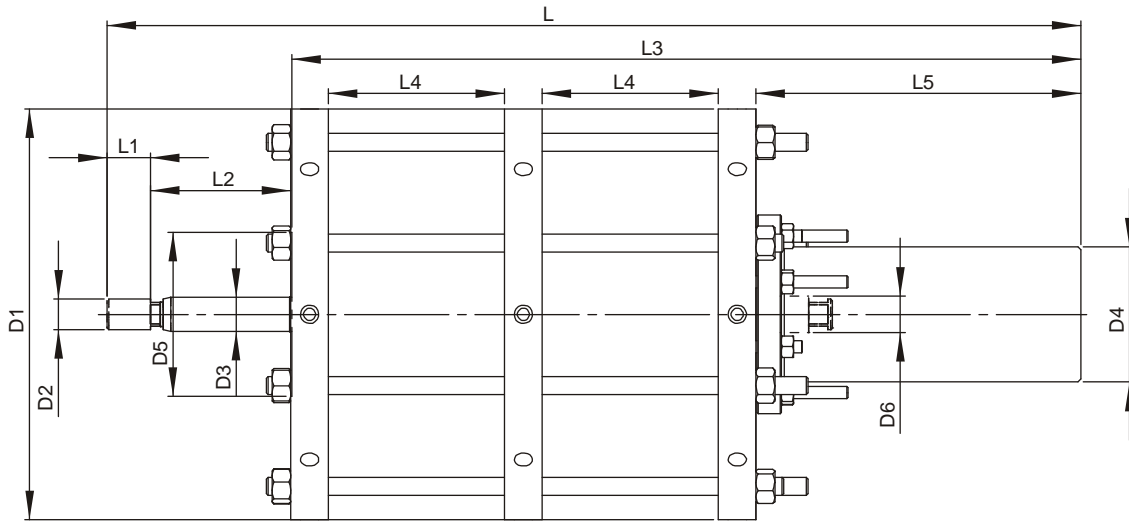
| Series | Piston Dia. | D1  | D2 (Piston Rod Thread - UNF) | D3 (Piston-Rod Ø) | L1 | L2  | L       | Stroke       | D4  | D5  | D6  | D7  | L3     | L4  | L5     | Spring Condition | MAWP (PSI) | Weight(Kg.) |     |
|--------|-------------|-----|------------------------------|-------------------|----|-----|---------|--------------|-----|-----|-----|-----|--------|-----|--------|------------------|------------|-------------|-----|
|        |             |     |                              |                   |    |     |         |              |     |     |     |     |        |     |        |                  |            | R           | E   |
| BO     | 155         | 204 | 3/4"                         | 22                | 33 | 66  | 668.4   | 25/15        | 87  | 110 | 73  | 310 | 568.4  | 83  | 448.4  | With Spring      | 85         | 60          | 36  |
| BO     | 205         | 258 | 3/4"                         | 22                | 33 | 89  | 806.4   | 50/40/25/15  | 114 | 125 | 90  | 320 | 683.4  | 104 | 542.4  | With Spring      | 85         | 80          | 56  |
| BO     | 295         | 383 | 1-1/2"                       | 42                | 48 | 247 | 1793.75 | 200/180/175  | 168 | 170 | 105 | 410 | 1497.7 | 282 | 1138.7 | With Spring      | 85         | 242         | 198 |
|        |             |     |                              |                   |    | 197 | 1543.75 | 150/130      | 140 | 170 | 105 | 410 | 1297.7 | 232 | 988.7  | With Spring      |            | 254         | 209 |
|        |             |     |                              |                   |    | 142 | 1288.75 | 100/70/50/40 | 140 | 170 | 105 | 410 | 1097.7 | 182 | 838.7  | With Spring      |            | 287         | 243 |
| BO     | 325         | 410 | 1-1/2"                       | 42                | 48 | 247 | 1793.75 | 200/180/175  | 168 | 170 | 105 | 410 | 1497.7 | 282 | 1138.7 | With Spring      | 85         | 262         | 218 |
|        |             |     |                              |                   |    | 197 | 1543.75 | 150/130      | 140 | 170 | 105 | 410 | 1297.7 | 232 | 988.7  | With Spring      |            | 275         | 230 |
|        |             |     |                              |                   |    | 142 | 1288.75 | 100/70/50/40 | 140 | 170 | 105 | 410 | 1097.7 | 182 | 838.7  | With Spring      |            | 308         | 265 |
| BO     | 375         | 460 | 1-1/2"                       | 42                | 48 | 247 | 1793.75 | 200/180/175  | 168 | 170 | 105 | 410 | 1497.7 | 282 | 1138.7 | With Spring      | 85         | 303         | 259 |
|        |             |     |                              |                   |    | 197 | 1543.75 | 150/130      | 140 | 170 | 105 | 410 | 1297.7 | 232 | 988.7  | With Spring      |            | 317         | 271 |
|        |             |     |                              |                   |    | 142 | 1288.75 | 100/70/50/40 | 140 | 170 | 105 | 410 | 1097.7 | 182 | 838.7  | With Spring      |            | 351         | 308 |

| Series | Piston dia. | Piston rod dia. inside cylinder (D3) | Piston rod dia. Inside cover cap (D8) | Pressure(kg/cm2) |            |            |            |            |            |            |            |            |            |            |            |            |            |
|--------|-------------|--------------------------------------|---------------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|        |             |                                      |                                       | 3                |            | 3.5        |            | 4          |            | 4.5        |            | 5          |            | 5.5        |            | 6          |            |
|        |             |                                      |                                       | Force (KN)       | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) |
| BO     | 155         | 22                                   | 28                                    | 5.44             | 5.37       | 6.34       | 6.26       | 7.24       | 7.15       | 8.15       | 8.05       | 9.06       | 8.95       | 9.97       | 9.84       | 10.87      | 10.74      |
| BO     | 205         | 22                                   | 28                                    | 9.59             | 9.52       | 11.19      | 11.11      | 12.79      | 12.7       | 14.39      | 14.29      | 15.99      | 15.87      | 17.59      | 17.46      | 19.19      | 19.05      |
| BO     | 295         | 42                                   | 43                                    | 19.69            | 19.67      | 22.97      | 22.94      | 26.25      | 26.22      | 29.53      | 29.5       | 32.82      | 32.78      | 36.1       | 36.06      | 39.38      | 39.34      |
| BO     | 325         | 42                                   | 43                                    | 23.99            | 23.97      | 27.98      | 27.96      | 31.98      | 31.95      | 35.98      | 35.95      | 39.98      | 39.95      | 43.98      | 43.94      | 47.98      | 47.93      |
| BO     | 375         | 42                                   | 43                                    | 32.07            | 32.05      | 37.42      | 37.39      | 42.76      | 42.73      | 48.1       | 48.07      | 53.45      | 53.42      | 58.8       | 58.76      | 64.14      | 64.1       |

Note : Spindle Dimension in Retract Position.



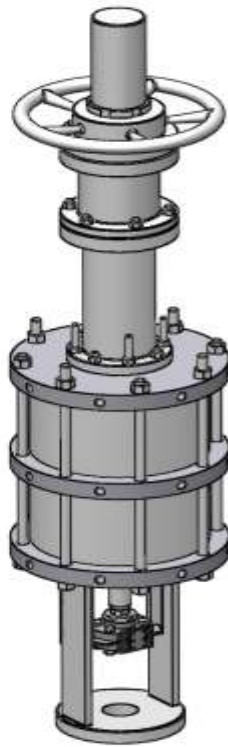
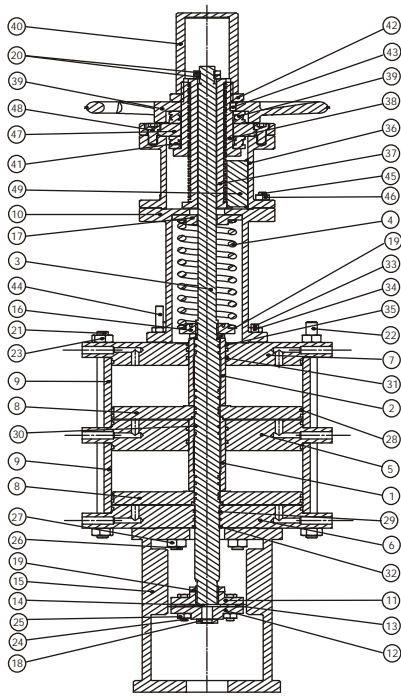
| NO | QTY | PART NAME                                 | MATERIAL        |
|----|-----|---|-----------------|
| 1  | 1   | Actuator Spindle Bush for Bottom Cylinder | SA 479 TP 304   |
| 2  | 1   | Actuator Spindle Bush for Top Cylinder    | SA 479 TP 304   |
| 3  | 1   | Actuator Spindle                          | SA 479 TP 304   |
| 4  | 1   | Actuator Spring                           | Spring Steel    |
| 5  | 1   | Middle Cover                              | SA 516 GR 70    |
| 6  | 1   | Bottom Cover                              | SA 516 GR 70    |
| 7  | 1   | Top Cover                                 | SA 516 GR 70    |
| 8  | 2   | Piston                                    | SA 516 GR 70    |
| 9  | 2   | Cylinder                                  | SA 106 GR B     |
| 10 | 1   | Cover Cap                                 | SA 216 GR WCB   |
| 11 | 1   | Coupling Actuator                         | SS 304          |
| 12 | 1   | Coupling Valve Spindle                    | SS 304          |
| 13 | 1   | Travel indicator                          | SS 304          |
| 14 | 1   | Take Off Arm Adjuster                     | SS 304          |
| 15 | 1   | Yoke                                      | SA 216 GR WCB   |
| 16 | 1   | Spring Cover Lower                        | Carbon Steel    |
| 17 | 1   | Spring Cover Upper                        | Carbon Steel    |
| 18 | 1   | HH Nut - 3/4"                             | SA 479 TP 304   |
| 19 | 2   | HH Nut - 1-1/2"                           | SA 479 TP 304   |
| 20 | 4   | Tie Rod                                   | Carbon Steel    |
| 21 | 4   | Big Tie Rod                               | Carbon Steel    |
| 22 | 16  | HH Nut - 3/4"                             | SA 194 GR 2H    |
| 23 | 4   | Bolt - 1/2"                               | SA 193 GR B7    |
| 24 | 4   | HH Nut - 1/2"                             | SA 194 GR 2H    |
| 25 | 6   | Yoke Stud - 3/4"                          | SA 193 GR B7    |
| 26 | 6   | HH Nut - 3/4"                             | SA 194 GR 2H    |
| 27 | 8   | O - Ring (325 x 304.17 x 5.33)            | NBR 70          |
| 28 | 2   | O - Ring (42 x 40.87 x 3.53)              | NBR 70          |
| 29 | 12  | O - Ring (43 x 36.09 x 3.53)              | NBR 70          |
| 30 | 4   | O - Ring (63 x 62.87 x 5.33)              | NBR 70          |
| 31 | 1   | NBR (A1 4015 N3587)                       | Neoprene Rubber |
| 32 | 4   | Cover Cap Stud - 1/2"                     | SA 193 GR B7    |
| 33 | 8   | HH Nut - 1/2"                             | SA 194 GR 2H    |
| 34 | 1   | NBR (A1 6020 N3587)                       | Neoprene Rubber |
| 35 | 4   | Cover cap Big Stud - 1/2"                 | SA 193 GR B7    |



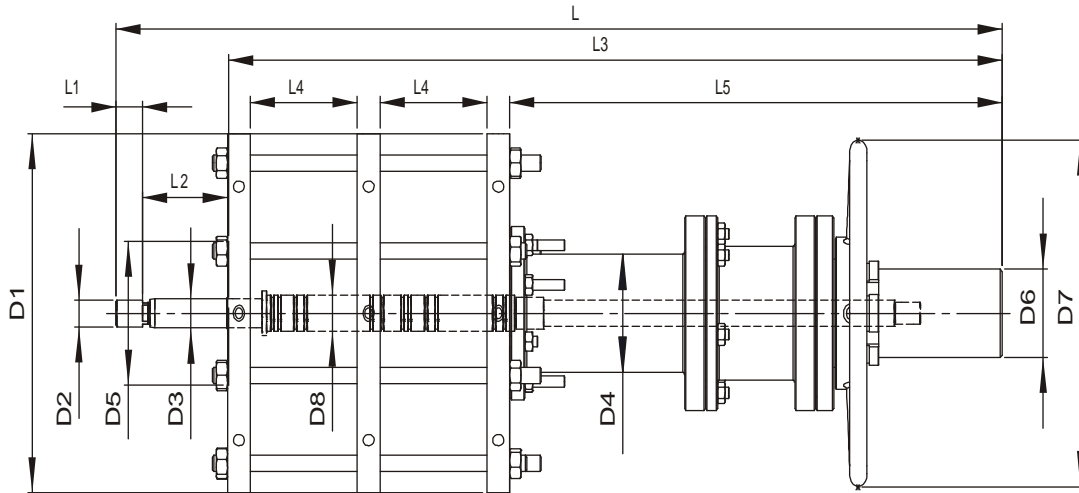
| Series | Piston Dia. | D1  | D2 (Piston Rod Thread - UNF) | D3 (Piston Rod - Ø) | L1 | L2  | L    | Stroke       | D4  | D5  | L3   | L4  | L5  | Spring Condition | MAWP (PSI) | Weight (Kg.) |     |
|--------|-------------|-----|------------------------------|---------------------|----|-----|------|--------------|-----|-----|------|-----|-----|------------------|------------|--------------|-----|
|        |             |     |                              |                     |    |     |      |              |     |     |      |     |     |                  |            | R            | E   |
| BO     | 325-DC      | 425 | 1-1/2"                       | 42                  | 48 | 250 | 1425 | 200/180/175  | 168 | 170 | 1126 | 282 | 446 | With Spring      | 85         | 316          | 314 |
|        |             |     |                              |                     |    | 150 | 1015 | 100/75/50/40 | 140 | 170 | 816  | 182 | 336 | With Spring      |            | 368          | 366 |
| BO     | 375-DC      | 480 | 1-1/2"                       | 42                  | 48 | 250 | 1425 | 200/180/175  | 168 | 170 | 1126 | 282 | 446 | With Spring      | 85         | 391          | 390 |
|        |             |     |                              |                     |    | 150 | 1015 | 100/75/50/40 | 140 | 170 | 816  | 182 | 336 | With Spring      |            | 451          | 447 |

| Series | Piston dia. | Piston rod dia. inside cylinder (D3) | Piston rod dia. Inside cover cap (D6) | Pressure(kg/cm <sup>2</sup> ) |            |            |            |            |            |            |            |            |            |            |            |            |            |
|--------|-------------|--------------------------------------|---------------------------------------|-------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|        |             |                                      |                                       | 3                             |            | 3.5        |            | 4          |            | 4.5        |            | 5          |            | 5.5        |            | 6          |            |
|        |             |                                      |                                       | Force (KN)                    | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) |
| BO     | 325-DC      | 42                                   | 43                                    | 47.98                         | 47.94      | 55.96      | 55.92      | 63.96      | 63.9       | 71.96      | 71.9       | 79.96      | 79.9       | 87.96      | 87.88      | 95.96      | 95.86      |
| BO     | 375-DC      | 42                                   | 43                                    | 64.14                         | 64.1       | 74.82      | 74.78      | 85.52      | 85.46      | 96.2       | 96.14      | 106.9      | 106.84     | 117.6      | 117.52     | 128.28     | 128.2      |

Note : Spindle Dimension in Retract Position.



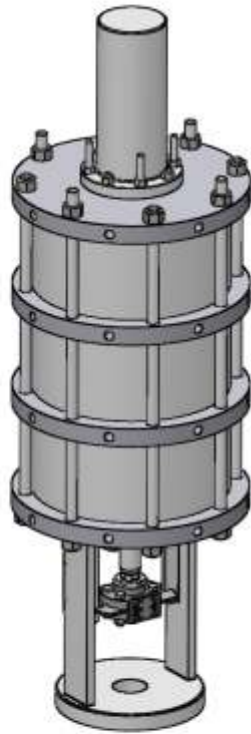
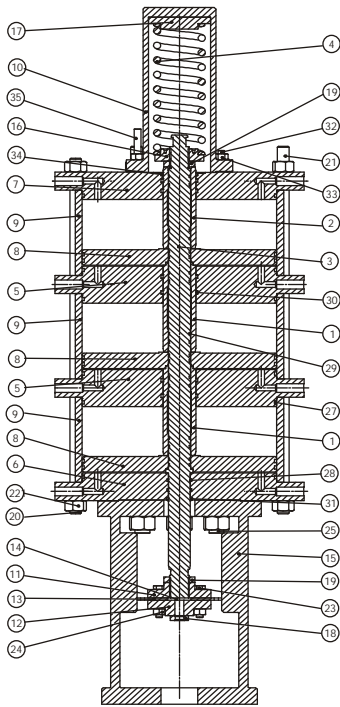
| NO | QTY | PART NAME                                 | MATERIAL        |
|----|-----|---|-----------------|
| 1  | 1   | Actuator Spindle Bush for Bottom Cylinder | SA 479 TP 304   |
| 2  | 1   | Actuator Spindle Bush for Top Cylinder    | SA 479 TP 304   |
| 3  | 1   | Actuator Spindle                          | SA 479 TP 304   |
| 4  | 1   | Actuator Spring                           | Spring Steel    |
| 5  | 1   | Middle Cover                              | SA 516 GR 70    |
| 6  | 1   | Bottom Cover                              | SA 516 GR 70    |
| 7  | 1   | Top Cover                                 | SA 516 GR 70    |
| 8  | 2   | Piston                                    | SA 516 GR 70    |
| 9  | 2   | Cylinder                                  | SA 106 GR B     |
| 10 | 1   | Cover Cap                                 | SA 216 GR WCB   |
| 11 | 1   | Coupling Actuator                         | SS 304          |
| 12 | 1   | Coupling Valve Spindle                    | SS 304          |
| 13 | 1   | Travel Indicator                          | SS 304          |
| 14 | 1   | Take Off Arm Adjuster                     | SS 304          |
| 15 | 1   | Yoke                                      | SA 216 GR WCB   |
| 16 | 1   | Spring Cover Lower                        | Carbon Steel    |
| 17 | 1   | Spring Cover Upper                        | Carbon Steel    |
| 18 | 1   | HH Nut - 3/4"                             | SA 479 TP 304   |
| 19 | 2   | HH Nut - 1-1/2"                           | SA 479 TP 304   |
| 20 | 2   | HH Nut - 1"                               | SA 479 TP 304   |
| 21 | 4   | Tie Rod                                   | Carbon Steel    |
| 22 | 4   | Big Tie Rod                               | Carbon Steel    |
| 23 | 16  | HH Nut - 3/4"                             | SA 194 GR 2H    |
| 24 | 4   | Bolt - 1/2"                               | SA 193 GR B7    |
| 25 | 4   | HH Nut - 1/2"                             | SA 194 GR 2H    |
| 26 | 6   | Yoke Stud - 3/4"                          | SA 193 GR B7    |
| 27 | 6   | HH Nut - 3/4"                             | SA 194 GR 2H    |
| 28 | 8   | O - Ring (325 x 304.17 x 5.33)            | NBR 70          |
| 29 | 2   | O - Ring (42 x 40.87 x 3.53)              | NBR 70          |
| 30 | 12  | O - Ring (43 x 36.09 x 3.53)              | NBR 70          |
| 31 | 4   | O - Ring (63 x 62.87 x 5.33)              | NBR 70          |
| 32 | 1   | NBR (A1 4015 N3587)                       | Neoprene Rubber |
| 33 | 4   | Cover Cap Stud - 1/2"                     | SA 193 GR B7    |
| 34 | 8   | HH Nut - 1/2"                             | SA 194 GR 2H    |
| 35 | 1   | NBR (A1 6020 N3587)                       | Neoprene Rubber |
| 36 | 1   | HandWheel Stem Cover                      | Carbon Steel    |
| 37 | 1   | Lead Screw Inner                          | SS410           |
| 38 | 1   | Lead Screw Outer                          | Bronze          |
| 39 | 1   | Handwheel                                 | Carbon steel    |
| 40 | 1   | Bearing Cover Cap                         | Carbon steel    |
| 41 | 2   | Thrust Bearing (O-28)                     | Heavy Duty      |
| 42 | 1   | Lock-Nut                                  | SA 479 TP 304   |
| 43 | 1   | Key For Handwheel                         | Carbon steel    |
| 44 | 4   | Cover cap Big Stud - 1/2"                 | SA 193 GR B7    |
| 45 | 6   | Stem Cover Stud - 1/2"                    | SA 193 GR B7    |
| 46 | 6   | HH Nut - 1/2"                             | SA 194 GR 25    |
| 47 | 1   | Stem Cover Flange                         | Carbon Steel    |
| 48 | 6   | Allen Key - 5/8"                          | SA 193 Gr. B7   |
| 49 | 1   | Stem Cover Plate                          | Carbon Steel    |



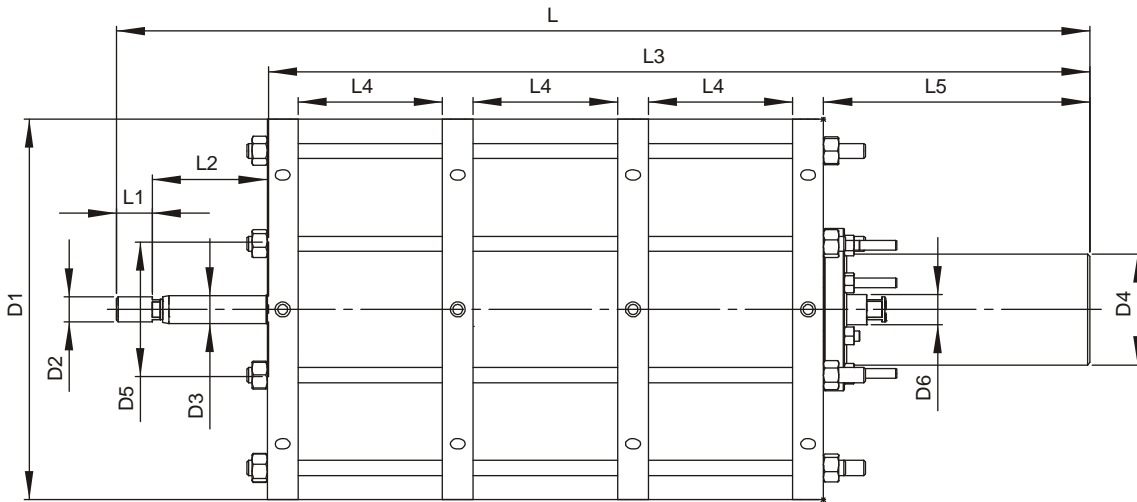
| Series | Piston Dia. | D1  | D2 (Piston Rod Thread - UNF) | D3 (Piston Rod - Ø) | L1 | L2  | L       | Stroke       | D4  | D5  | D6  | D7  | L3     | L4  | L5     | Spring Condition | MAWP (PSI) | Weight (Kg.) |     |
|--------|-------------|-----|------------------------------|---------------------|----|-----|---------|--------------|-----|-----|-----|-----|--------|-----|--------|------------------|------------|--------------|-----|
|        |             |     |                              |                     |    |     |         |              |     |     |     |     |        |     |        |                  |            | R            | E   |
| BO     | 325-DC      | 425 | 1-1/2"                       | 42                  | 48 | 250 | 2117.75 | 200/180/175  | 168 | 170 | 105 | 410 | 1818.7 | 282 | 1138.7 | With Spring      | 85         | 380          | 336 |
|        |             |     |                              |                     |    | 150 | 1517.75 | 100/75/50/40 | 140 | 170 | 105 | 410 | 1318.7 | 182 | 838.7  | With Spring      |            | 438          | 394 |
| BO     | 375-DC      | 480 | 1-1/2"                       | 42                  | 48 | 250 | 2117.75 | 200/180/175  | 168 | 170 | 105 | 410 | 1818.7 | 282 | 1138.7 | With Spring      | 85         | 455          | 411 |
|        |             |     |                              |                     |    | 150 | 1517.75 | 100/75/50/40 | 140 | 170 | 105 | 410 | 1318.7 | 182 | 838.7  | With Spring      |            | 518          | 475 |

| Series | Piston dia. | Piston rod dia. inside cylinder (D3) | Piston rod dia. Inside cover cap (D8) | Pressure(kg/cm <sup>2</sup> ) |       |            |       |            |       |            |       |            |        |            |        |            |       |
|--------|-------------|--------------------------------------|---------------------------------------|-------------------------------|-------|------------|-------|------------|-------|------------|-------|------------|--------|------------|--------|------------|-------|
|        |             |                                      |                                       | 3                             |       | 3.5        |       | 4          |       | 4.5        |       | 5          |        | 5.5        |        | 6          |       |
|        |             |                                      |                                       | Force (KN)                    |       | Force (KN) |       | Force (KN) |       | Force (KN) |       | Force (KN) |        | Force (KN) |        | Force (KN) |       |
|        |             |                                      |                                       | R                             | E     | R          | E     | R          | E     | R          | E     | R          | E      | R          | E      | R          | E     |
| BO     | 325-DC      | 42                                   | 43                                    | 47.98                         | 47.94 | 55.96      | 55.92 | 63.96      | 63.9  | 71.96      | 71.9  | 79.96      | 79.9   | 87.96      | 87.88  | 95.96      | 95.86 |
| BO     | 375-DC      | 42                                   | 43                                    | 64.14                         | 64.1  | 74.82      | 74.78 | 85.52      | 85.46 | 96.2       | 96.14 | 106.9      | 106.84 | 117.6      | 117.52 | 128.28     | 128.2 |

Note : Spindle Dimension in Retract Position.



| NO | QTY | PART NAME                                 | MATERIAL        |
|----|-----|---|-----------------|
| 1  | 2   | Actuator Spindle Bush for Bottom Cylinder | SA 479 TP 304   |
| 2  | 1   | Actuator Spindle Bush for Top Cylinder    | SA 479 TP 304   |
| 3  | 1   | Actuator Spindle                          | SA 479 TP 304   |
| 4  | 1   | Actuator Spring                           | Spring Steel    |
| 5  | 2   | Middle Cover                              | SA 516 GR 70    |
| 6  | 1   | Bottom Cover                              | SA 516 GR 70    |
| 7  | 1   | Top Cover                                 | SA 516 GR 70    |
| 8  | 3   | Piston                                    | SA 516 GR 70    |
| 9  | 3   | Cylinder                                  | SA 106 GR B     |
| 10 | 1   | Cover Cap                                 | SA 216 GR WCB   |
| 12 | 1   | Coupling Actuator                         | SS 304          |
| 13 | 1   | Coupling Valve Spindle                    | SS 304          |
| 14 | 1   | Travel indicator                          | SS 304          |
| 15 | 1   | Take Off Arm Adjuster                     | SS 304          |
| 16 | 1   | Yoke                                      | SA 216 GR WCB   |
| 17 | 1   | Spring Cover Lower                        | Carbon Steel    |
| 18 | 1   | Spring Cover Upper                        | Carbon Steel    |
| 19 | 1   | HH Nut - 3/4"                             | SA 479 TP 304   |
| 20 | 2   | HH Nut - 1-1/2"                           | SA 479 TP 304   |
| 21 | 4   | Tie Rod                                   | Carbon Steel    |
| 22 | 4   | Big Tie Rod                               | Carbon Steel    |
| 23 | 16  | HH Nut - 7/8"                             | SA 194 GR 2H    |
| 24 | 4   | Bolt - 1/2"                               | SA 193 GR B7    |
| 25 | 4   | HH Nut - 1/2"                             | SA 194 GR 2H    |
| 26 | 6   | Yoke Stud - 1-1/8"                        | SA 193 GR B7    |
| 27 | 6   | HH Nut - 1-1/8"                           | SA 194 GR 2H    |
| 28 | 12  | O - Ring (375 x 354.97 x 5.33)            | NBR 70          |
| 29 | 2   | O - Ring (42 x 40.87 x 3.53)              | NBR 70          |
| 30 | 18  | O - Ring (43 x 36.09 x 3.53)              | NBR 70          |
| 31 | 6   | O - Ring (63 x 62.87 x 5.33)              | NBR 70          |
| 32 | 1   | NBR (A1 4015 N3587)                       | Neoprene Rubber |
| 33 | 4   | Cover Cap Stud - 1/2"                     | SA 193 GR B7    |
| 34 | 4   | HH Nut - 1/2"                             | SA 194 GR 2H    |
| 34 | 1   | NBR (A1 6020 N3587)                       | Neoprene Rubber |
| 35 | 4   | Cover cap Big Stud - 1/2"                 | SA 193 GR B7    |



| Series | Piston Dia. | D1  | D2 (Piston Rod Thread - UNF) | D3 (Piston Rod - Ø) | L1 | L2  | L    | Stroke       | D4  | D5  | L3   | L4  | L5  | Spring Condition | MAWP (PSI) | Weight |     |
|--------|-------------|-----|------------------------------|---------------------|----|-----|------|--------------|-----|-----|------|-----|-----|------------------|------------|--------|-----|
|        |             |     |                              |                     |    |     |      |              |     |     |      |     |     |                  |            | R      | E   |
| BO     | 375-TC      | 480 | 1-1/2"                       | 42                  | 48 | 265 | 1761 | 200/180/175  | 168 | 235 | 1447 | 282 | 446 | With Spring      | 85         | 551    | 550 |
|        |             |     |                              |                     |    | 160 | 1246 | 100/75/50/40 | 140 | 235 | 1037 | 182 | 336 | With Spring      |            | 629    | 627 |

| Series | Piston dia. | Piston rod dia. inside cylinder (D3) | Piston rod dia. Inside cover cap (D6) | Pressure(kg/cm2) |            |            |            |            |            |            |            |            |            |            |            |            |       |
|--------|-------------|--------------------------------------|---------------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|
|        |             |                                      |                                       | 3                |            | 3.5        |            | 4          |            | 4.5        |            | 5          |            | 5.5        |            | 6          |       |
|        |             |                                      |                                       | Force (KN)       | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) | Force (KN) |       |
| BO     | 375-TC      | 42                                   | 43                                    | 96.21            | 96.15      | 112.26     | 112.17     | 128.28     | 128.22     | 144.3      | 144.21     | 160.35     | 160.26     | 176.4      | 176.28     | 192.42     | 192.3 |

Note : Spindle Dimension in Retract Position.

## Range of Products



HP Bypass valve



Minimum flow  
re-circulation valve



LP Bypass valve  
for 660 MW power plant



Desuperheater-integral  
multinozzle type



Dump tube



Spray water control  
valve for 660 MW