

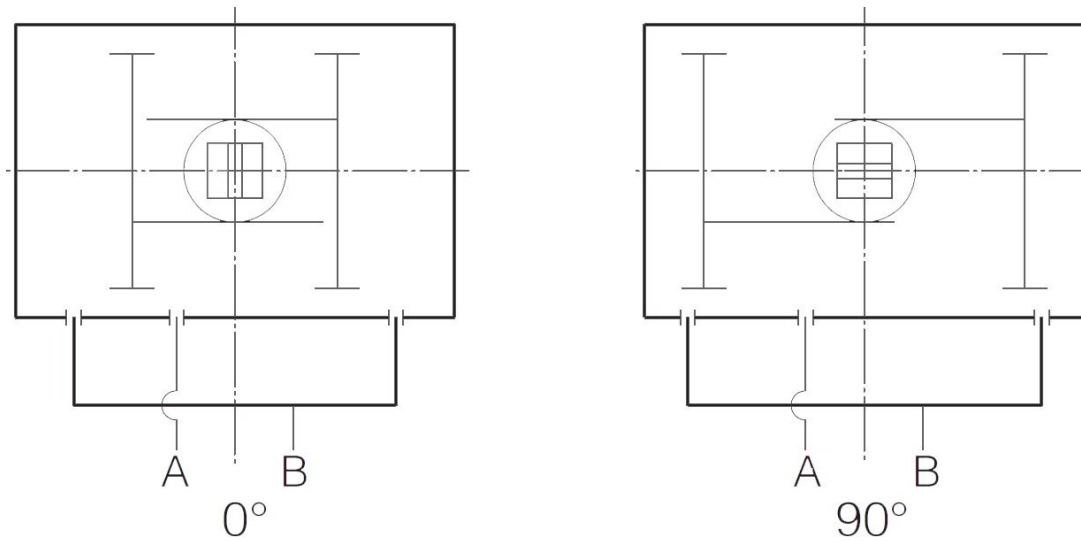
气动执行机构



一、气缸结构说明：

| 气 缸 外 形 图 | 序 号 | 部 件 说 明 |
|-----------|-----|--|
| | 1 | Indicator 指示器：NAMUR 标准指示器便于安装开关、定位器等附件。 |
| | 2 | Pinion 输出轴：镀镍合金钢、高精度一体式输出轴同时符合NAMUR、ISO5211、DIN3337标准。 |
| | 3 | Actuator Body 缸体：ASTM6005压铸铝合金缸体可以采用硬质氧化、环氧树脂喷涂（根据要求喷涂兰色、橙色、黄色等）、PTFE涂层或镀镍满足不同要求 |
| | 4 | End caps 端盖：压铸铝合金表面金属粉末喷涂各种颜色、PTFE涂层或镀镍处理。 |
| | 5 | Pistons 活塞：双活塞齿条、采用铸铝硬质氧化或者铸钢镀锌处理，安装位置对称、运作迅速、使用寿命长，简单的颠倒活塞可以改变旋转方向。 |
| | 6 | Travel adjustment 行程调节：两个独立的行程调节螺钉可以进行方便、精确±5°的调节开、关位置。 |
| | 7 | High performance springs 高性能弹簧：采用优质材料、涂层处理，预压装配。具有较强的抗腐蚀性和使用寿命。能够安全、简单的拆卸单作用执行器，通过改变弹簧数量满足不同的力矩输出范围。 |
| | 8 | Bearings & Guides 轴承、导板：采用低摩擦、长寿命复合材料，避免了金属与金属的直接接触，维修更换简单方便。 |
| | 9 | O-rings 密封：在常温工作条件下使用丁腈橡胶，在高温或低温时采用氟橡胶或硅橡胶。 |

二、双作用执行器动作原理：



A口进气，压缩空气推动活塞向外运动，使执行器输出轴顺时针旋转(0o-90o)，B口排气。

B口进气，压缩空气推动活塞向内运动，使执行器输出轴逆时针旋转(90o-0o)，A口排气。

三、双作用执行器输出力矩：

| Model | Air supply pressure (Unit:Bar) (Unit:Nm) 输入气源压力(单位：巴) | | | | | | | | | |
|----------|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 2 | 2.5 | 3 | 4 | 4.5 | 5 | 5.5 | 6 | 7 | 8 |
| RT020DA | 8.0 | 10.0 | 12.0 | 16.0 | 18.0 | 20.0 | 21.9 | 23.9 | 27.9 | 31.9 |
| RT035DA | 14.6 | 18.2 | 21.9 | 29.2 | 32.8 | 36.5 | 40.1 | 43.8 | 51.1 | 58.4 |
| RT050DA | 20.1 | 25.1 | 30.1 | 40.1 | 45.1 | 50.2 | 55.2 | 60.2 | 70.2 | 80.3 |
| RT075DA | 31.4 | 39.2 | 47.0 | 62.7 | 70.5 | 78.4 | 86.2 | 94.1 | 109.7 | 125.4 |
| RT110DA | 45.1 | 56.4 | 67.7 | 90.3 | 101.6 | 112.9 | 124.1 | 135.4 | 158.0 | 180.6 |
| RT160DA | 66.1 | 82.7 | 99.2 | 132.2 | 148.8 | 165.3 | 181.8 | 198.4 | 231.4 | 264.5 |
| RT255DA | 100.3 | 125.4 | 150.5 | 200.6 | 225.7 | 250.3 | 275.9 | 301.0 | 351.1 | 401.3 |
| RT435DA | 171.0 | 213.8 | 256.5 | 342.0 | 384.8 | 427.5 | 470.3 | 513.0 | 598.5 | 684.0 |
| RT665DA | 266.0 | 332.5 | 399.0 | 532.0 | 598.5 | 665.0 | 731.5 | 798.0 | 931.0 | 1064.0 |
| RT1000DA | 425.6 | 532.0 | 638.4 | 851.2 | 957.6 | 1064.0 | 1170.4 | 1276.8 | 1489.6 | 1702.4 |
| RT1200DA | 532.0 | 665.0 | 798.0 | 1064.0 | 1197.0 | 1330.0 | 1463.0 | 1596.0 | 1862.0 | 2128.0 |
| RT1800DA | 769.5 | 961.9 | 1154.3 | 1539.0 | 1731.4 | 1932.8 | 2116.1 | 2308.5 | 2693.3 | 3078.0 |
| RT2700DA | 1168.6 | 1462.1 | 1754.5 | 2339.3 | 2631.7 | 2924.1 | 3216.5 | 3508.9 | 4093.7 | 4678.6 |

执行器的选型：

在正常操作条件下，双作用执行器考虑的安全系数为20%~30%，单作用执行器考虑的安全系数为30%~50%。

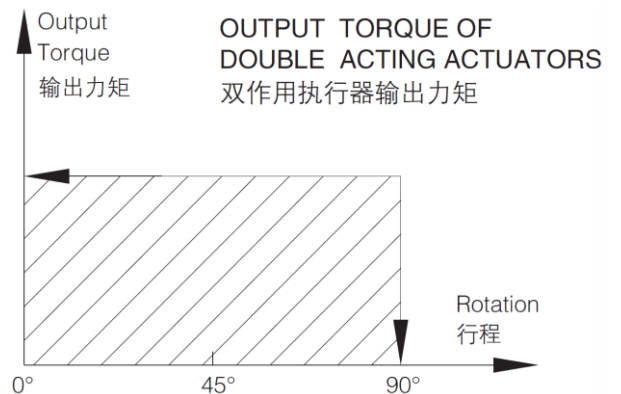
示例：

阀门力矩=100Nm

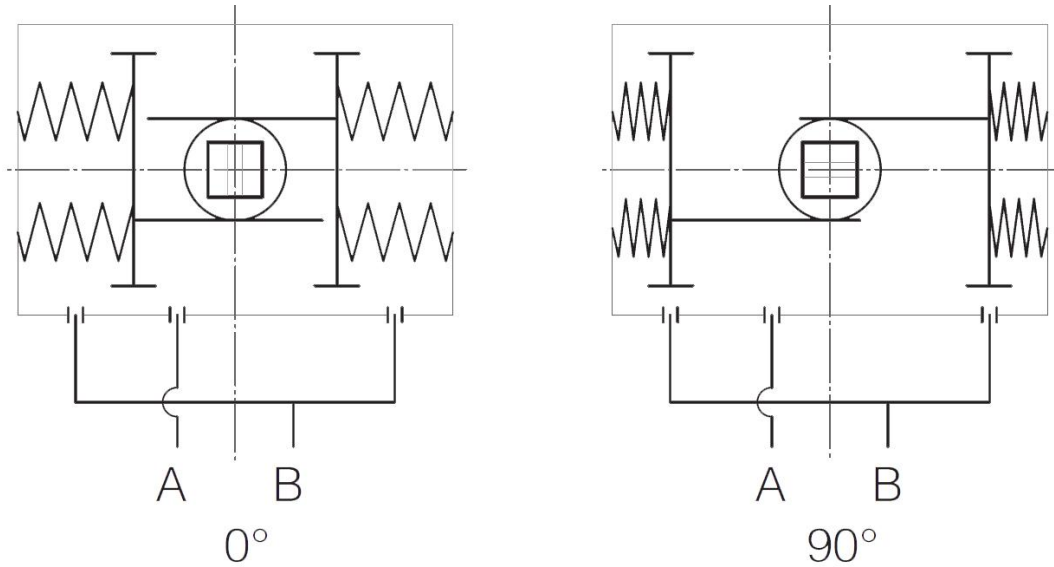
安全力矩=100 × (1+30%)=130Nm

气源压力=5Bar

对照双作用力矩表，选配双作用执行器最小规格为RT160DA。



四、单作用执行器动作原理：



A口进气，压缩空气克服弹簧力，推动活塞向外运动，执行器输出轴顺时针转动(0° -90°)，B口排气。
 执行器失气，活塞在弹簧力的作用下向内运动，执行器输出轴逆时针转动(90° -0°)，A口排气。

五、单作用执行器输出力矩：

| Output torque of air to springs 气源克服弹簧输出力矩 | | | | | | | | | | | | | | | | | Springs' output 弹簧输出力矩 | | |
|--|--------------|---------|---------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|------------------------|-------|------|
| Air pressure | 2 Bar | | 2.5 Bar | | 3 Bar | | 4 Bar | | 5 Bar | | 6 Bar | | 7 Bar | | 8 Bar | | 90 | 0° | |
| Model | Spring Q. ty | 0° | 90 | 0° | 90 | 0° | 90 | 0° | 90 | 0° | 90 | 0° | 90 | 0° | 90 | 0° | 90 | Start | End |
| | | RT020SR | 5 | 3.7 | 1.6 | 5.7 | 3.6 | | | | | | | | | | | | |
| 6 | 2.8 | | 0.3 | 4.8 | 2.3 | 6.8 | 4.3 | | | | | | | | | | | 7.4 | 5.1 |
| 7 | | | | 3.9 | 1.0 | 5.9 | 3.0 | 9.9 | 7.0 | | | | | | | | | 8.6 | 5.9 |
| 8 | | | | | | 5.0 | 1.7 | 9.0 | 5.7 | 13.1 | 9.8 | | | | | | | 9.9 | 6.8 |
| 9 | | | | | | | | 8.1 | 4.4 | 12.2 | 8.5 | 16.2 | 12.5 | | | | | 11.1 | 7.6 |
| 10 | | | | | | | | 7.2 | 3.1 | 11.3 | 7.2 | 15.3 | 11.2 | 19.3 | 15.2 | 23.4 | 19.3 | 12.4 | 8.5 |
| 11 | | | | | | | | | | 10.4 | 5.9 | 14.4 | 9.9 | 18.4 | 13.9 | 22.5 | 18.0 | 13.6 | 9.3 |
| 12 | | | | | | | | | | 9.5 | 4.6 | 13.5 | 8.6 | 17.5 | 12.6 | 21.6 | 16.7 | 14.8 | 10.1 |
| RT035SR | 5 | 7.0 | 3.2 | 10.6 | 6.8 | | | | | | | | | | | | | 10.4 | 6.8 |
| | 6 | 5.6 | 1.0 | 9.2 | 4.6 | 12.7 | 8.1 | | | | | | | | | | | 12.5 | 8.2 |
| | 7 | | | 7.7 | 2.4 | 11.2 | 5.9 | 18.3 | 13.0 | | | | | | | | | 14.6 | 9.6 |
| | 8 | | | | | 9.8 | 3.7 | 16.9 | 10.8 | 24.0 | 17.9 | | | | | | | 16.7 | 10.9 |
| | 9 | | | | | | | 15.4 | 8.6 | 22.5 | 15.7 | 29.6 | 22.8 | | | | | 18.8 | 12.3 |
| | 10 | | | | | | | 14.0 | 6.4 | 21.1 | 13.5 | 28.2 | 20.6 | 35.3 | 27.7 | 42.4 | 34.8 | 20.9 | 13.7 |
| | 11 | | | | | | | | | 19.7 | 11.3 | 26.8 | 18.4 | 33.9 | 25.5 | 41 | 32.6 | 22.9 | 15.0 |
| | 12 | | | | | | | | | 18.2 | 9.1 | 25.3 | 16.2 | 32.4 | 23.3 | 39.5 | 30.4 | 25.0 | 16.4 |
| RT050SR | 5 | 90 | 4.9 | 14.1 | 10.0 | | | | | | | | | | | | | 14.5 | 10.5 |
| | 6 | 6.8 | 1.8 | 11.9 | 6.9 | 16.9 | 11.9 | | | | | | | | | | | 17.4 | 12.7 |
| | 7 | | | 9.7 | 3.9 | 14.7 | 8.9 | 24.8 | 19.0 | | | | | | | | | 20.3 | 14.8 |
| | 8 | | | | | 12.4 | 5.8 | 22.5 | 15.9 | 32.5 | 25.9 | | | | | | | 23.2 | 16.9 |
| | 9 | | | | | | | 20.3 | 12.9 | 30.3 | 22.9 | 40.4 | 33.0 | | | | | 26.1 | 19.0 |
| | 10 | | | | | | | 18.1 | 9.8 | 28.1 | 19.8 | 38.2 | 29.9 | 48.3 | 40.0 | 58.3 | 50.0 | 29.0 | 21.1 |
| | 11 | | | | | | | | | 25.9 | 16.8 | 36.0 | 26.9 | 46.1 | 37.0 | 56.1 | 47.0 | 31.9 | 23.2 |
| | 12 | | | | | | | | | 23.7 | 13.7 | 33.8 | 23.8 | 43.9 | 33.9 | 53.9 | 43.9 | 34.7 | 25.3 |

| | | | | | | | | | | | | | | | | | | | |
|---------|----|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| RT075SR | 5 | 14.2 | 6.6 | 21.9 | 14.3 | | | | | | | | | | | | | 23.0 | 15.8 |
| | 6 | 10.8 | 1.7 | 18.5 | 9.4 | 26.2 | 17.1 | | | | | | | | | | | 27.6 | 19.0 |
| | 7 | | | 15.2 | 4.6 | 22.9 | 12.3 | 38.3 | 27.7 | | | | | | | | | 32.2 | 22.1 |
| | 8 | | | | | 19.6 | 7.4 | 35.0 | 22.8 | 50.5 | 38.3 | | | | | | | 36.8 | 25.3 |
| | 9 | | | | | | | 31.6 | 18.0 | 47.1 | 33.5 | 62.5 | 48.9 | | | | | 41.4 | 28.5 |
| | 10 | | | | | | | 28.3 | 13.2 | 43.8 | 28.7 | 59.2 | 44.1 | 74.6 | 59.5 | 90.0 | 74.9 | 46.0 | 31.6 |
| | 11 | | | | | | | | | 40.5 | 23.8 | 55.9 | 39.2 | 71.3 | 54.6 | 86.7 | 70.0 | 50.6 | 34.8 |
| | 12 | | | | | | | | | 37.1 | 19.0 | 52.5 | 34.4 | 67.9 | 49.8 | 83.3 | 65.2 | 55.2 | 38.0 |
| RT110SR | 5 | 20.8 | 9.2 | 32.2 | 20.6 | | | | | | | | | | | | | 34.4 | 23.3 |
| | 6 | 15.9 | 2.0 | 27.3 | 13.4 | 38.7 | 24.8 | | | | | | | | | | | 41.2 | 28.0 |
| | 7 | | | 22.4 | 6.1 | 33.8 | 17.5 | 56.5 | 40.2 | | | | | | | | | 48.1 | 32.7 |
| | 8 | | | | | 28.9 | 10.3 | 51.6 | 33.0 | 74.3 | 55.7 | | | | | | | 55.0 | 37.3 |
| | 9 | | | | | | | 46.7 | 25.8 | 69.4 | 48.5 | 92.1 | 71.2 | | | | | 61.9 | 42.0 |
| | 10 | | | | | | | 41.8 | 18.5 | 64.5 | 41.2 | 87.2 | 63.9 | 110.0 | 86.7 | 132.7 | 109.4 | 68.7 | 46.7 |
| | 11 | | | | | | | | | 59.5 | 34.0 | 82.2 | 56.7 | 105.0 | 79.5 | 127.7 | 102.2 | 75.6 | 51.4 |
| | 12 | | | | | | | | | 54.6 | 26.8 | 77.3 | 49.5 | 100.1 | 72.3 | 122.8 | 95.0 | 82.5 | 56.0 |
| RT160SR | 5 | 32.5 | 14.0 | 48.9 | 30.4 | | | | | | | | | | | | | 49.2 | 31.6 |
| | 6 | 25.8 | 3.6 | 42.2 | 20.0 | 58.7 | 36.5 | | | | | | | | | | | 59.1 | 38.0 |
| | 7 | | | 35.6 | 9.7 | 52.1 | 26.2 | 85.0 | 59.1 | | | | | | | | | 68.9 | 44.3 |
| | 8 | | | | | 45.4 | 15.8 | 78.3 | 48.7 | 111.1 | 81.5 | | | | | | | 78.7 | 50.6 |
| | 9 | | | | | | | 71.7 | 38.4 | 104.5 | 71.2 | 137.4 | 104.1 | | | | | 88.6 | 56.9 |
| | 10 | | | | | | | 65.0 | 28.0 | 97.8 | 60.8 | 130.7 | 93.7 | 163.6 | 126.6 | 196.5 | 159.5 | 98.4 | 63.3 |
| | 11 | | | | | | | | | 91.1 | 50.4 | 124.0 | 83.3 | 156.9 | 116.2 | 189.8 | 149.1 | 108.3 | 69.6 |
| | 12 | | | | | | | | | 84.5 | 40.1 | 117.4 | 73.0 | 150.3 | 105.9 | 183.2 | 138.8 | 118.1 | 75.9 |
| RT255SR | 5 | 47.9 | 20.5 | 72.9 | 45.5 | | | | | | | | | | | | | 78.4 | 52.4 |
| | 6 | 36.9 | 4.0 | 61.9 | 29.0 | 87.9 | 55.0 | | | | | | | | | | | 94.1 | 62.8 |
| | 7 | | | 50.8 | 12.5 | 76.8 | 38.5 | 127.8 | 89.5 | | | | | | | | | 109.7 | 73.3 |
| | 8 | | | | | 65.8 | 22.0 | 116.8 | 73.0 | 167.8 | 124.0 | | | | | | | 125.4 | 83.8 |
| | 9 | | | | | | | 105.8 | 56.5 | 156.8 | 107.5 | 208.8 | 159.5 | | | | | 141.1 | 94.2 |
| | 10 | | | | | | | 94.8 | 40.0 | 145.8 | 91.0 | 197.8 | 143.0 | 248.8 | 194.0 | 299.8 | 245.0 | 156.8 | 104.7 |
| | 11 | | | | | | | | | 134.8 | 74.5 | 186.8 | 126.5 | 237.8 | 177.5 | 288.8 | 228.5 | 172.4 | 115.2 |
| | 12 | | | | | | | | | 123.7 | 58.0 | 175.7 | 110.0 | 226.7 | 161.0 | 277.7 | 212.0 | 188.1 | 125.7 |
| RT435SR | 5 | 84.7 | 39.3 | 128.7 | 83.3 | | | | | | | | | | | | | 129.0 | 85.8 |
| | 6 | 66.6 | 12.1 | 110.6 | 56.1 | 154.6 | 100.1 | | | | | | | | | | | 154.8 | 102.9 |
| | 7 | | | 92.6 | 29.0 | 136.6 | 73.0 | 224.6 | 161.0 | | | | | | | | | 180.5 | 120.1 |
| | 8 | | | | | 118.5 | 45.8 | 206.5 | 133.8 | 294.5 | 221.8 | | | | | | | 206.3 | 137.3 |
| | 9 | | | | | | | 188.5 | 106.7 | 276.5 | 194.7 | 363.5 | 281.7 | | | | | 232.1 | 154.4 |
| | 10 | | | | | | | 170.4 | 79.5 | 258.4 | 167.5 | 345.4 | 254.5 | 433.4 | 342.5 | 521.4 | 430.5 | 257.9 | 171.6 |
| | 11 | | | | | | | | | 240.3 | 140.4 | 327.3 | 227.4 | 415.3 | 315.4 | 503.3 | 403.4 | 283.7 | 188.7 |
| | 12 | | | | | | | | | 222.3 | 113.2 | 309.3 | 200.2 | 397.3 | 288.2 | 485.3 | 376.2 | 309.5 | 205.9 |
| RT665SR | 5 | 120.0 | 47.7 | 187.0 | 114.7 | | | | | | | | | | | | | 208.3 | 139.7 |
| | 6 | 90.6 | 3.9 | 157.6 | 70.9 | 224.6 | 137.9 | | | | | | | | | | | 250 | 168 |
| | 7 | | | 128.2 | 27.0 | 195.2 | 94.0 | 329.2 | 228.0 | | | | | | | | | 292 | 196 |
| | 8 | | | | | 165.8 | 50.2 | 299.8 | 184.2 | 432.8 | 317.2 | | | | | | | 333 | 223 |
| | 9 | | | | | | | 270.4 | 140.3 | 403.4 | 273.3 | 537.4 | 407.3 | | | | | 375 | 251 |
| | 10 | | | | | | | 241.0 | 96.4 | 374.0 | 229.5 | 508.0 | 363.5 | 641.0 | 496.5 | 775.0 | 630.5 | 417 | 279 |
| | 11 | | | | | | | | | 344.6 | 185.6 | 478.6 | 319.6 | 611.6 | 452.6 | 745.6 | 586.6 | 458 | 307 |
| | 12 | | | | | | | | | 315.2 | 141.7 | 449.2 | 275.7 | 582.2 | 408.7 | 716.2 | 542.7 | 500 | 335 |

| | | | | | | | | | | | | | | | | | | | |
|----------|----|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|------|------|------|------|----------|------|
| RT1000SR | 5 | 220 | 105 | 327 | 212 | | | | | | | | | | | | | 293 | 190 |
| | 6 | 178 | 40 | 285 | 147 | 393 | 255 | | | | | | | | | | | 352 | 227 |
| | 7 | | | 243 | 82 | 351 | 190 | 566 | 405 | | | | | | | | | 410 | 265 |
| | 8 | | | | | 309 | 125 | 524 | 340 | 740 | 556 | | | | | | | 469 | 303 |
| | 9 | 237 | | | | | | 482 | 275 | 698 | 491 | 913 | 706 | | | | | 527 | 341 |
| | 10 | 179 | | | | | | 440 | 210 | 656 | 426 | 871 | 641 | 1087 | 857 | 1302 | 1072 | 586 | 379 |
| | 11 | | | | | | | | | 614 | 361 | 829 | 576 | 1045 | 792 | 1260 | 1007 | 645 | 417 |
| | 12 | | | | | | | | | 572 | 296 | 787 | 511 | 1003 | 727 | 1218 | 942 | 703 | 455 |
| RT1200SR | 5 | 237 | 126 | 369 | 258 | | | | | | | | | | | | | 360 | 260 |
| | 6 | 179 | 46 | 311 | 178 | 442 | 309 | | | | | | | | | | | 432 | 313 |
| | 7 | | | 253 | 99 | 384 | 230 | 647 | 493 | | | | | | | | | 503 | 365 |
| | 8 | | | | | 326 | 150 | 589 | 413 | 853 | 677 | | | | | | | 575 | 417 |
| | 9 | | | | | | | 531 | 333 | 795 | 597 | 1058 | 860 | | | | | 647 | 469 |
| | 10 | | | | | | | 473 | 253 | 737 | 517 | 1000 | 780 | 1263 | 1043 | 1526 | 1306 | 719 | 521 |
| | 11 | | | | | | | | | 679 | 437 | 942 | 700 | 1205 | 963 | 1468 | 1226 | 791 | 573 |
| | 12 | | | | | | | | | 621 | 357 | 884 | 620 | 1147 | 883 | 1410 | 1146 | 863 | 625 |
| RT1300SR | 5 | 341 | 190 | 534 | 383 | | | | | | | | | | | | | 525 | 389 |
| | 6 | 255 | 73 | 448 | 266 | 642 | 460 | | | | | | | | | | | 630 | 467 |
| | 7 | | | 361 | 150 | 555 | 344 | 941 | 730 | | | | | | | | | 735 | 544 |
| | 8 | | | | | 469 | 227 | 855 | 613 | 1242 | 1000 | | | | | | | 84=130n0 | 622 |
| | 9 | | | | | | | 768 | 496 | 1155 | 883 | 1542 | 1270 | | | | | 945 | 700 |
| | 10 | | | | | | | 682 | 380 | 1069 | 767 | 1456 | 1154 | 1842 | 1540 | 2229 | 1927 | 1050 | 778 |
| | 11 | | | | | | | | | 983 | 650 | 1370 | 1037 | 1756 | 1423 | 2143 | 1710 | 1155 | 855 |
| | 12 | | | | | | | | | 896 | 533 | 1283 | 920 | 1669 | 1306 | 2056 | 1693 | 1260 | 933 |
| RT2700SR | 5 | 585 | 346 | 879 | 640 | | | | | | | | | | | | | 745 | 530 |
| | 6 | 467 | 151 | 761 | 475 | 1054 | 768 | | | | | | | | | | | 894 | 636 |
| | 7 | | | 644 | 309 | 937 | 602 | 1525 | 1190 | | | | | | | | | 1043 | 742 |
| | 8 | | | | | 819 | 437 | 1407 | 1025 | 1994 | 1612 | | | | | | | 1192 | 848 |
| | 9 | | | | | | | 1289 | 859 | 1876 | 1446 | 2463 | 2033 | | | | | 1341 | 954 |
| | 10 | | | | | | | 1171 | 694 | 1758 | 1281 | 2345 | 1868 | 2932 | 2455 | 3519 | 3042 | 1490 | 1060 |
| | 11 | | | | | | | | | 1640 | 1115 | 2227 | 1702 | 2814 | 2289 | 3401 | 2876 | 1639 | 1166 |
| | 12 | | | | | | | | | 1523 | 950 | 2110 | 1537 | 2697 | 2124 | 3284 | 2711 | 1788 | 1272 |

单作用执行器的选型：

在正常工作条件下，单作用执行器考虑的安全系数为30%-50%，

例如：阀门需要力矩=80N.m，安全力矩=80×(1+30%)=104N.m，气源压力=5Bar，对照单作用执行器输出力矩表，我们可以查到RT435SR输出力矩为：空气行程0°=308N.m，空气行程：90°=247N.m，弹簧行程90°=181N.m，弹簧行程0°=120N.m，所以输出力矩均大于我们需要的力矩。